WORK PLAN

FOR

WATERSHED PROTECTION, FLOOD PREVENTION, AND DRAINAGE

EAST FRANKLIN WATERSHED

Franklin Parish, Louisiana

WATERSHED WORK PLAN

EAST FRANKLIN WATERSHED

Catahoula, Franklin, and Richland Parishes, Louisiana

Prepared under the Authority of the Watershed Protection and Flood Prevention Act (Public Law 566, 83d Congress, 68 Stat. 666) as amended

Prepared by: Northeast Soil and Water Conservation District

Franklin Parish Police Jury

Franklin Parish Watershed Commission

Catahoula Soil and Water Conservation District

Catahoula Parish Police Jury

With assistance by:

United States Department of Agriculture
Soil Conservation Service
Forest Service

United States Department of the Interior
Fish and Wildlife Service

State of Louisiana
Wild Life and Fisheries Commission
Department of Public Works

April 1975

EAST FRANKLIN WATERSHED

LOUISIANA

ADDENDUM

WATERSHED WORK PLAN

Phase-In of Principles and
Standards for Planning Water
and Related Land Resources

April 1975

EAST FRANKLIN WATERSHED

LOUISIANA

CONTENTS OF ADDENDUM

EAST FRANKLIN WATERSHED

LOUISIANA

Section 1 - Benefit Cost Ratio of the Selective Alternative

Based on 1974 construction costs the average annual project cost is $366,500. On the basis at a discount rate of 5.875 percent, the total average annual benefits of this project are $1,078,700. The ratio of project benefits to costs are 2.9 to 1 without secondary benefits. With secondary benefits the benefit-cost ratio is 3.3 to 1.

SECTION 2

SELECTED ALTERNATIVE
NATIONAL ECONOMIC DEVELOPMENT ACCOUNT
East Franklin Watershed, Louisiana

Components	Measures of Effects[a/] (Dollars)
The value to users of increased outputs of goods and services	
Beneficial effects:	
A. Flood prevention	$ 608,400
B. Drainage	430,400
C. Utilization of unemployed and underemployed labor resources	
1. Project construction	24,800
2. Operation, Maintenance, Replacement	15,100
Total beneficial effects	$1,078,700
The value of resources required for a plan	
Adverse effects:	
A. Channel work with appurtenant structures	
1. 1. Project installation	$ 218,200
2. Project administration	25,200
3. Operation, Maintenance, Replacement	115,700
Total adverse effects	359,100
Net beneficial effects	$ 719,600

a/ Average annual

SELECTED ALTERNATIVE
REGIONAL DEVELOPMENT ACCOUNT
East Franklin Watershed, Louisiana

Components	Measures of Effects[a/] State of Louisiana (dollars)	Rest of Nation
A. Income:		
Beneficial effects:		
1. The value of increased output of goods and services to users residing in the region		
a. Flood prevention	$ 608,400	-
b. Drainage	430,400	-
c. Utilization of unemployed and underemployed labor resources-project construction and OM&R	39,900	
2. The value of output to users residing in the region from external economics		
a. Secondary	158,300	-
Total beneficial effects	$1,237,000	-
Adverse effects:		
1. The value of resources contributed from within the region to achieve the outputs		
a. Multiple-purpose drainage and flood prevention channel work		
1) Project installation	$ 104,300	$ 113,900
2) Project administration	1,400	23,800
3) OM&R	115,700	-0-
Total adverse effects	221,400	137,700
Net beneficial effects	$1,015,600	$ -137,700
B. Employment		
Beneficial effects		
1. Employment of project construction	59 man-years of local labor over a 5-year period	-
2. Employment for installation of land treatment	170 man-years of local labor over a 10-year period	-
3. Employment in OM&R	3 permanent semi-skilled jobs	-
Total beneficial effects	229 man-years of local labor over the project installation period	-
	3 permanent semi-skilled jobs	-
Adverse effects:		
1. Decrease in number and types of jobs	-	-
Total adverse benefits	-	-
Net beneficial effects	229 man-years of local labor over the project installation period	
	3 permanent semi-skilled jobs	

a/ Average annual

SELECTED ALTERNATIVE
REGIONAL DEVELOPMENT ACCOUNT (cont.)
East Franklin Watershed, Louisiana

Components	Measures of Effects[a/] State of Louisiana	Measures of Effects[a/] Rest of Nation
C. Population Distribution:		
Beneficial effects:	The number of rural males between 20 and 45 years of age decreased 6.5 percent from 1960 to 1970. The increased annual average farm income of about $1,200 per farm should help slow the trends of decreasing number of farms and out-migration. The project will create a need for 229 man-years of local labor over the project installation period and three permanent semi-skilled jobs in an area which had a net out-migration of 5,520 persons.	1. A reduction in out-migration would decrease the rate of large metropolitan area increases inherent in mass population management. 2. A reduction in out-migration would reduce the loss in manpower efficiency as a result of individual readjustment in trade skills and psychological and sociological environment.
Adverse effects:	---	---
D. Regional Economic Base and Stability		
Beneficial effects:	Flood protection and improved drainage provided by the project will reduce the risks to agriculture, enable increased efficiencies of agricultural production, and bring about increases in farm income. Average annual net farm income will increase $944,000. The project will create a need for 229 man-years of local labor over the project installation period and three permanent semi-skilled jobs in an area which has been classified by the Economic Development Administration as eligible for financial assistance under Title IV because of severely depressed economic conditions.	---
	Flood protection and improved drainage are essential to continued agricultural productivity and the prevention of loss of farm income in the watershed.	---
Adverse effects:	---	

a/ Average annual

SECTION 2

SELECTED ALTERNATIVE
ENVIRONMENTAL QUALITY ACCOUNT
East Franklin Watershed, Louisiana

Components	Measures of Effects
Beneficial and adverse effects:	
A. Areas of Natural Beauty	1. Water oak, willow oak, Nuttall oak, and pecan seedlings planted to spoil areas as part of the project measures will increase aesthetic value.
	2. Spoil areas spread, shaped according to design, and vegetated with various grasses will present a pleasing appearance.
	3. Improved agricultural production as a result of the project will present attractive pastoral scenes.
	4. Selected trees will be preserved along the channel berm and spoil areas to preserve the natural beauty.
	5. Channel work will conform as close as possible to the natural alignment to preserve the natural setting and create a better environmental balance.
	6. Channel areas will be cleared of solid waste to allow natural plant succession to recover and create a more aesthetically pleasing appearance.
	7. Areas of channel bank erosion will be repaired, smoothed, and vegetated to improve the natural appearance.
	8. Channel work will be performed from one side where high value natural vegetation exists. This will preserve as much of the natural undisturbed area as possible and maintain the aesthetic value.
	9. During construction, areas will be disturbed creating a temporary undesirable appearance.

SELECTED ALTERNATIVE
ENVIRONMENTAL QUALITY ACCOUNT (cont.)
East Franklin Watershed, Louisiana

Components	Measures of Effects
Beneficial and adverse effects:	
B. Quality considerations of water, land, and air resources	1. Sediment from sheet erosion over the entire watershed will be reduced from 4.4 tons to 4 tons or 9 percent.
	2. Turbidity will decrease.
	3. During construction there will be a slight increase in air and noise pollution.
	4. During construction there will be a temporary increase in sediment yield.
	5. The reduction in sediment will reduce the amount of pesticides and fertilizers entering aquatic environments.
C. Biological resources and selected ecosystems	1. The clearing of 277 acres of hardwood will be detrimental to the to the deer, squirrel, and turkey habitat.
	2. The conversion of 708 acres of wooded channel bank and forest edges to open land will be beneficial to doves and quail.
	3. Habitat loss for rabbits will amount to 143 acres; other rabbit habitat along channels disturbed by the project will revert to original carrying capacity following construction as a result of seeding berms and natural reestablishment of vegetation.
	4. The preservation of 147 acres of Type 7 and 23 acres of Type 5 wetlands will be accomplished by installation of a structure for water control (weir).

SELECTED ALTERNATIVE
ENVIRONMENTAL QUALITY ACCOUNT (cont.)
East Franklin Watershed, Louisiana

Components	Measures of Effects
Beneficial and adverse effects:	
C. Biological resources and selected ecosystems (cont'd.)	5. Pools totaling 147 acres of permanent water will create fish habitat supporting a standing crop of about 30 pounds of fish per acre.
	6. Habitat for amphibians, reptiles, and wading birds will be created by these pools.
	7. Upland wildlife habitat will be maintained, improved, and/or created on 800 acres of cropland and 1,600 acres of other land.
	8. The crop and forage base will be maintained and improved.
	9. Channel work will be performed from one side only thereby retaining much natural vegetation, trees, and terrestrial habitat.
	10. Plant succession following construction will be accelerated by planting seedlings.
	11. The water temperature will be increased approximately 5 degrees Fahrenheit during the summer months.
D. Historical, Archaeological, and Geological	1. No known archaeological or historical sites will be disturbed.
E. Irreversible or Irretrievable Commitment	1. Selected channels will preclude the use of 1,066 acres for any other purpose for the life of the project.

SECTION 2

SELECTED ALTERNATIVE
SOCIAL WELL-BEING ACCOUNT
East Franklin Watershed, Louisiana

Components	Measures of Effects
Beneficial and adverse effects:	
A. Real income distribution	1. Project will create 150 low to medium income permanent jobs for area residents.
	2. Regional income benefits of $1,237,000 will be created. The percent of distribution of this income by income classes is not readily available.
	3. Local costs borne by the region total $1,015,600. The percent of distribution of this cost by income classes is not reality available.
B. Life, health, and safety	1. A 78-percent reduction in out-of-bank flow in the watershed will decrease the flood hazard duration over roads resulting in less interference in farming operations. There will be less interference with the utilization of these roads by local residents to places of employment and normal day-to-day activities. The delaying of schoolbuses and reroutings caused by flooding will be reduced. The flood reduction will increase the chance of emergency vehicles using these roads.

SECTION 3

ENVIRONMENTAL QUALITY PLAN
(Abbreviated)

ENVIRONMENTAL PROBLEMS

Two major problems affecting the quality of the human environment in this watershed are flooding and inadequate drainage. Throughout most of the watershed, these problems act in combination and are considered inseparable due to the nearly level terrain which is readily inundated by the accumulation of direct precipitation and overflow of inadequate channels. These problems occur on approximately 76,200 acres.

Sediment deposited by floodwater results in inconveniences to the residents of the watershed. It is undesirable under foot, produces dirty conditions, adds to the effort of maintaining clean homes, and detracts from the aesthetic value of the watershed.

In residential areas water remaining in standing pools after high water recedes becomes stagnant and oftentimes odorous. It harbors mosquitoes and becomes a potential source for disease. These pools are also an attractive nuisance for children.

Trash and litter transported by high water is unsightly and unsanitary. This condition along with the aftereffects of high water in general attracts rodents which carry diseases.

Sediment transported by excess runoff sporadically curtails the use of water for domestic and livestock purposes. This condition also adversely influences fish habitat and other aquatic populations in the watershed. It has been intensified since 1960 by the conversion of forest land to cropland.

This conversion of land use is causing a net loss in both game and nongame species of wildlife. Loss of forest habitat is resulting in a loss of white-tailed deer, squirrels, swamp rabbits, wild turkeys, and many nongame species. They are being replaced by open land species of bobwhite quail, mourning doves, cottontail rabbits, and other non-game species. These open land species are limited in number due to the "clean farming" associated with intensive crop production.

This type of farming provides highly inadequate cover. When the crops are harvested, a vast amount of this wildlife cover is totally and suddenly removed leaving cover only along fence rows, drainage ditches, and in scattered odd areas. These areas are sparse and limited.

Fish habitat in the watershed is low in quality and limited due to lack of impoundments. Consequently, fish populations are also low in number. Present trends indicate this problem will continue to exist.

Plant populations of soybeans and other crops are subject to loss of growth limitations due to excessive wetness caused by inadequate drainage. Pastureland is also adversely affected by poor drainage. Undesirable grasses persist and water-tolerant weeds flourish. These fields exhibiting poor growth condition detract from the aesthetic value of the watershed.

Water storage for recreation is limited due to the flat terrain. Present recreation facilities are likewise limited.

Trash dumping and littering is a problem in scattered areas. This is aesthetically undesirable, unsanitary and conducive to stream pollution.

Wildfires are always a problem. They cause destruction of valuable timber and wildlife habitat. This leaves the land surface bare which results in soil erosion. At the time of occurrence these fires cause a considerable amount of air pollution. Prevention of these fires is in itself a problem.

COMPONENT NEEDS

Environmental component needs for the watershed consist of floodwater damage reduction, improved drainage, sediment reduction, fish and wildlife habitat improvement and development, forest land management, water quality improvement, recreational development, enhancement of the aesthetic value, and proper waste disposal.

PLAN ELEMENTS

The elements of this Environmental Quality Plan give consideration to the components of the objective of environmental quality. These components include areas of natural beauty; land, air, and water quality; biological resources; and historical, archaeological, and geological concerns.

Land treatment conservation measures as an element include conservation cropping systems, land grading, drainage mains and laterals, crop and grassland management, forest land management including wildfire control, and wildlife wetland and upland habitat management. These measures would be applied to 92,100 acres at an estimated average annual cost of $323,000.

It is estimated that 58,000 acres of cropland and pastureland on the more poorly-drained soils could be reverted to bottom land hardwoods at an estimated average annual cost of $22,000.

In addition, approximately 5,000 acres of crop and pastureland could be changed to wetland wildlife habitat by developing water supplies, constructing levees and installing pumps and water control structures at an approximate average annual cost of $17,100. This development would provide food and cover for waterfowl, furbearers, crawfish, and other wildlife.

Fish farming would also be developed. This would involve small impoundments with an indicated total water surface increase of 200 acres having an average annual cost of about $7,900.

The problem of trash dumping and littering could be alleviated by enacting and enforcing ordinances and conducting public campaigns against dumping and littering. Large waste receptacles could be placed throughout the parish and emptied regularly. Additional sanitary landfills could also be established for a wider distribution of waste disposal. This could average $50,000 per year.

Pollution by dust from dirt roads can be alleviated by paving the roads. The average annual cost of this measure could amount to $125,000.

Upland habitat development and improvement can be realized by establishing wildlife management practices that would include occasional hedgerows across open fields, planting wildlife shrubs in odd or unused small areas of farms and other tracts of land. Indications are that a program of this nature would cost an average of $25,000 per year. This could be a program with economic inducements provided to land users to get them to participate.

The total average annual cost of this Environmental Quality Plan would amount to an estimated $570,000. It would require a capital investment of about $9,225,000 for installation. Annual costs of operation and maintenance would be approximately $80,000.

<u>Institutional Arrangements Available and Needed for the Implementation of the Environmental Quality Plan (EQ Plan)</u>

Legal entities of government exist which would enable implementation of the Environmental Quality Plan. These include parish

government and joint powers of parish government and soil and water conservation districts.

Private, State, and Federal programs are available to provide financial and technical assistance for both land acquisition and the establishment of measures included in the Environmental Quality Plan.

ENVIRONMENTAL EFFECTS

Areas of Natural Beauty

This plan will visually improve the landscape through improved vegetation, less weeds and undesirable vegetation. Areas of erosion will also be minimized or eliminated.

Quality Consideration of Water, Air, and Land Resources

The project will bring about a reduction in turbidity and in sediment borne by the water. This will increase its value for livestock and municipal use. Use of soils within their capability will reduce erosion.

Biological Resources and Selected Ecological Systems

Land treatment measures will provide for maintaining and improving upland wildlife habitat for both small game and nongame species. The project will cause a loss of approximately 143 acres of rabbit habitat. Squirrel habitat along channels disrupted by the project will recover in about 20 years. The required clearing of 277 acres of forest land will reduce wild turkey habitat. Forest management will provide for additional browse for deer.

Wetland wildlife habitat will be increased and provide for a larger population of waterfowl, amphibians, reptiles, and other aquatic life.

Irreversible and Irretrievable Effects

The expenditure of $9,225,000 for installation of this project would be an irretrievable effect.

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WATERSHED WORK PLAN AGREEMENT

between the

<u>NORTHEAST SOIL AND WATER CONSERVATION DISTRICT</u>
Local Organization

<u>FRANKLIN PARISH POLICE JURY</u>
Local Organization

<u>FRANKLIN PARISH WATERSHED COMMISSION</u>
Local Organization

<u>CATAHOULA SOIL AND WATER CONSERVATION DISTRICT</u>
Local Organization

<u>CATAHOULA PARISH POLICE JURY</u>
Local Organization

(hereinafter referred to as the Sponsoring Local Organization)

State of Louisiana

and the

Soil Conservation Service
United States Department of Agriculture
(hereinafter referred to as the Service)

Whereas, application has heretofore been made to the Secretary of Agriculture by the Sponsoring Local Organization for assistance in preparing a plan for works of improvement for the East Franklin Watershed, State of Louisiana, under the authority of the Watershed Protection and Flood Prevention Act (Public Law 566, 83d Congress; 68 Stat. 666), as amended; and

Whereas, the responsibility for administration of the Watershed Protection and Flood Prevention Act, as amended, has been assigned by the Secretary of Agriculture to the Service; and

Whereas, there has been developed through the cooperative efforts of the Sponsoring Local Organization and the Service a mutually satisfactory plan for works of improvement for the East Franklin Watershed, State of Louisiana, hereinafter referred to as the watershed work plan, which plan is annexed to and made a part of this agreement;

Now, therefore, in view of the foregoing considerations, the Sponsoring Local Organization and the Secretary of Agriculture, through the Service, hereby agree on the watershed work plan, and further agree that the works of improvement as set forth in said plan can be installed in about ten (10) years.

It is mutually agreed that in installing and operating and maintaining the works of improvement substantially in accordance with the terms, conditions, and stipulations provided for in the watershed work plan:

1. The Franklin Parish Police Jury and the Catahoula Parish Police Jury will acquire, with other than Public Law 566 funds, such land rights as will be needed in connection with the works of improvement. This will be an approximate cost of $1,424,900.

2. The Franklin Parish Police Jury and the Catahoula Parish Police Jury assure that comparable replacement dwellings will be available for individuals and persons displaced from dwellings, and will provide relocation assistance advisory services and relocation assistance, make the relocation payments to displaced persons, and otherwise comply with the real property acquisition policies contained in the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (Public Law 91-646, 84 Stat. 1894) effective as of January 2, 1971, and the Regulations issued by the Secretary of Agriculture pursuant thereto. The costs of relocation payments will be shared by the Sponsoring Local Organization and the Service as follows:

	Sponsoring Local Organization	Service	Estimated Relocation Payment Costs
	(Percent)	(Percent)	(Dollars)
Relocation Payment	66	34	-0-1/

1/ Investigation has disclosed that under present conditions the project measures will not result in the displacement of any person, business, or farm operation. However, if relocations become necessary, relocation payments will be cost-shared in accordance with the percentages shown.

3. The Franklin Parish Police Jury and the Catahoula Parish Police Jury will acquire or provide assurance that landowners or water users have acquired such water rights pursuant to State law as may be needed in the installation and operation of the works of improvement.

4. The percentages of construction costs of structural measures to be paid by the Franklin Parish Police Jury and the Catahoula Parish Police Jury and by the Service are as follows:

Works of Improvement	Sponsoring Local Organization	Service	Estimated Construction Cost
	(Percent)	(Percent)	(Dollars)
Channel Work with Appurtenant Structures	22.8	77.2	2,058,200

5. The percentages of the engineering costs to be borne by the Franklin Parish Police Jury and the Catahoula Parish Police Jury and the Service are as follows:

Works of Improvement	Sponsoring Local Organization	Service	Estimated Engineering Cost
	(Percent)	(Percent)	(Dollars)
All	-0-	100	143,600

6. The Sponsoring Local Organization (the Franklin and the Catahoula Parish Police Juries) and the Service will each bear the costs of Project Administration which it incurs, estimated to be $22,620 and $395,680, respectively.

7. The Northeast Soil and Water Conservation District and the Catahoula Soil and Water Conservation District will provide assistance to landowners and operators to assure the installation of the land treatment measures included in the watershed work plan.

8. The Northeast Soil and Water Conservation District and the Catahoula Soil and Water Conservation District will work with landowners and operators to operate and maintain the land treatment measures for the protection and improvement of the watershed.

9. The Catahoula Parish Police Jury and the Franklin Parish Police Jury will be responsible for the operation and maintenance of the structural works of improvement; each by actually performing the work within the boundaries of that parish or by arranging for such work in accordance with agreements to be entered into prior to issuing invitations to bid for construction work.

10. The costs shown in this agreement represent preliminary estimates. The actual costs incurred in the installation of works of improvement will be used to determine the final costs to be borne by each party.

11. This agreement is not a fund obligating document. Financial and other assistance to be furnished by the Service in carrying out the watershed work plan is contingent on the congressional appropriations.

    A separate agreement will be entered into between the Service and the affected local organization or organizations within the Sponsoring Local Organization before either party initiates work involving funds of the other party. Such agreement will set forth in detail the financial and working arrangements and other conditions that are applicable to the specific works of improvement.

12. The watershed work plan may be amended or revised, and this agreement may be modified or terminated only by mutual agreement of the parties hereto except that an amendment to incorporate changes affecting one specific structural measure may be made by mutual agreement between the Service and the Sponsor(s) having specific responsibilities for the particular structural measure(s) involved. The Service may terminate financial and other assistance in whole, or in part, at any time whenever it is determined that the Sponsoring Local Organization has failed to comply with the conditions of this agreement. The Service shall promptly notify the Sponsoring Local Organization in writing of the determination and the reasons for the termination, together with the effective date. Payments made to the Sponsoring Local Organization or recoveries by the Service under projects terminated for cause shall be in accordance with the legal rights and liabilities of the parties.

13. No member of or delegate to Congress, or resident commissioner, shall be admitted to any share or part of this agreement, or to any benefit that may arise therefrom; but this provision shall not be construed to extend to this agreement if made with a corporation for its general benefit.

14. The program conducted will be in compliance with all requirements respecting nondiscrimination as contained in the Civil Rights Act of 1964, and the regulations of the Secretary of Agriculture (7 C.F.R. 15.1-15.12), which provide that no person in the United States shall, on the ground of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any activity receiving Federal financial assistance.

15. This agreement will not become effective until the Service has issued a notification of approval and authorizes assistance.

NORTHEAST SOIL AND WATER CONSERVATION DISTRICT
Local Organization

By John K. Lilleton
Title Chairman
Date 4/7/75

Post Office Box 272
Winnsboro, Louisiana 71295
Address Zip Code

The signing of this agreement was authorized by a resolution of the governing body of the Northeast Soil and Water Conservation District
Local Organization
adopted at a meeting held on 4/7/75

H. A. Crew
Secretary, Local Organization

Post Office Box 272
Winnsboro, Louisiana 71295
Address Zip Code

Date 4/7/75

FRANKLIN PARISH POLICE JURY
Local Organization

By Roy McManus
Title President
Date 3/4/75

Parish Courthouse
Winnsboro, Louisiana 71295
Address Zip Code

The signing of this agreement was authorized by a resolution of the governing body of the Franklin Parish Police Jury
Local Organization
adopted at a meeting held on 3/4/75

Amos E. Bell
Secretary, Local Organization

Parish Courthouse
Winnsboro, Louisiana 71295
Address Zip Code

Date 3/4/75

FRANKLIN PARISH WATERSHED COMMISSION
Local Organization

By ______________________

Title Chairman

Date 4/7/75

Post Office Box 272
Winnsboro, Louisiana 71295
Address Zip Code

The signing of this agreement was authorized by a resolution of the governing body of the Franklin Parish Watershed Commission
Local Organization
adopted at a meeting held on 4/7/75

____
Secretary, Local Organization

Post Office Box 272
Winnsboro, Louisiana 71295
Address Zip Code

Date 4/7/75

CATAHOULA SOIL AND WATER CONSERVATION DISTRICT
Local Organization

By ______________________

Title Chairman

Date 3/11/75

Post Office Box 239
Harrisonburg, Louisiana 71340
Address Zip Code

The signing of this agreement was authorized by a resolution of the governing body of the Catahoula Soil and Water Conservation District
Local Organization
adopted at a meeting held on March 11, 1975

____
Secretary, Local Organization

Post Office Box 239
Harrisonburg, Louisiana 71340
Address Zip Code

Date 3/11/75

CATAHOULA PARISH POLICE JURY
Local Organization

By H. C. Peck Jr.

Title President

Harrisonburg, Louisiana 71340
Address Zip Code

Date 4/7/75

The signing of this agreement was authorized by a resolution of the governing body of the ______
Local Organization
adopted at a meeting held on 4/7/75

L. C. Scott
Secretary, Local Organization

Date 4/7/75

Harrisonburg, Louisiana 71340
Address Zip Code

CATAHOULA PARISH POLICE JURY
P.O. BX 258
HARRISONBURG, LOUISIANA 71340

Appropriate and careful consideration has been given to the environmental statement prepared for this project and to the environmental aspects thereof.

Soil Conservation Service
United States Department of Agriculture

Approved by:

Alton Mangum
State Conservationist

MAY 7 1975
Date

WATERSHED WORK PLAN

EAST FRANKLIN WATERSHED

Catahoula, Franklin, and Richland Parishes, Louisiana

April 1975

SUMMARY OF PLAN

The watershed is in the northeastern part of Louisiana. It contains 196,000 acres (306 square miles), including 184,000 acres in Franklin Parish, 11,500 acres in Catahoula Parish, and 500 acres in Richland Parish. Approximately 60 percent of the area is cropland, 14 percent is pastureland, 19 percent is forest land, and 7 percent is in other uses such as roads, channels, lakes, communities, farmsteads, etc. The Sponsors are the Northeast and the Catahoula Soil and Water Conservation Districts, the Franklin and the Catahoula Parish Police Juries, and the Franklin Parish Watershed Commission. Technical assistance was furnished by the Soil Conservation Service and the Forest Service of the U.S. Department of Agriculture, the Fish and Wildlife Service of the U.S. Department of the Interior, and the Wild Life and Fisheries Commission and the Department of Public Works of the State of Louisiana.

The lands are moderately productive; however, poor drainage and frequent and prolonged flooding on 52 percent of the cropland and pastureland cause considerable damage. These conditions decrease quality of crops, limit stocking rates on pastures, and increase the costs of production. A comprehensive system of channels which will provide adequate outlets for on-farm and group drainage systems protected by erosion control measures is necessary to provide the needed degree of drainage and flood protection. The Sponsors have expressed a desire to improve or conserve habitat for fish and wildlife. The purposes of the project are watershed protection, flood prevention, and drainage.

Analyses of various levels of protection by evaluation units were conducted and a 4-year level of flood protection and drainage was chosen. This design level does not eliminate all out-of-bank flow from the 4-year storm but it does limit the duration of flooding to 24 hours or less on lands adjacent to project channels. Flood damages will be reduced by about 78 percent.

Approximately 238 miles of channels were investigated. This study indicates 222 miles of channels will be required to provide adequate outlets for the watershed. Sixteen miles of channels were eliminated to minimize adverse effects to fish and wildlife.

SUMMARY

Of the 222 miles of project channels, 36 miles are presently adequate to carry the design flow. However, these channels must be maintained so that the remaining 186 miles requiring work will function as designed. The flow characteristics in the 222 miles of project channels are enumerated as follows:

Type of Flow	Miles	Percent
Ephemeral	193	87
Intermittent	22	10
Ponded water	7	3
Total	222	100

The condition of project channels prior to installation is classified as follows:

Classification	Miles	Percent
Well-defined natural channels	47	21
Manmade or previously modified	169	76
Nonexisting or no-defined channel	6	3
Total	222	100

Twenty-eight structures for water control (weirs) will be installed at strategic points in channels to minimize adverse effects to fish and wildlife habitat, reduce sediment delivery downstream, reduce growth of vegetation on the channel bottom during dry seasons, help preserve existing water supplies necessary to agricultural production, and maintain the aesthetic value of the landscape. These structures will be installed prior to work on the involved channels and will create approximately 46 miles (147 surface acres) of permanent water. Structures for water control (pipe drops) and grade stabilization structures (drop inlets) will be installed as channel appurtenances. Vegetation will be established in the rights-of-way and disturbed areas after construction. Spoil in forest land will be planted with hardwood seedlings to partially mitigate loss of wildlife habitat.

About 2,900 persons in farm households will benefit from increased income generated by the project. The other 6,000 watershed residents, as well as surrounding area residents, will benefit from the increased volume of business generated by the higher incomes and the decreased flooding of roads.

Of the 1,863 acres of rights-of-way that will be disturbed during project installation, approximately 823 acres are occupied by existing channels, berms, and spoil. The remaining 1,040 acres, consisting of about 292 acres of open land, 384 acres of wooded channel banks, and 264 acres of forest, will be needed to install project measures.

The disturbances will result in population decreases for most forest wildlife species and increases for most open land wildlife species.

The work plan proposes an installation period of 5 years for structural measures and 10 years for land treatment measures. The total installation cost is estimated to be $9,224,300, of which Public Law 566 funds will bear $3,155,430 (about 34 percent), and other funds will bear $6,068,870 (about 66 percent).

Landowners and operators cooperating with the Northeast and the Catahoula Soil and Water Conservation Districts and the Louisiana Forestry Commission will install land treatment measures that reduce floodwater and sediment damages and improve drainage conditions. Measures to adequately treat 72,400 acres of cropland, 16,600 acres of pasture and 3,100 acres of other land will be installed. In addition, conservation plans will have been prepared and some land treatment begun on 36,600 acres of cropland and about 7,800 acres of pastureland. This is dependent to a large extent on the installation of project-type outlets. The cost of these land treatment measures is estimated to be $5,179,300. Of this total, Public Law 566 funds will provide $1,027,200, and other funds will provide $4,152,100. Landowners and operators, with aid from Federal and State programs, will bear the cost of applying land treatment measures. The estimated cost of structural measures is $4,045,000, of which Public Law 566 funds will bear $2,128,230 and other funds will bear $1,916,770.

Average annual benefits amount to $1,237,000. The average annual cost, including amortization of installation cost plus operation and maintenance, is $359,100. The benefit-cost ratio is 3.4 to 1.

Landowners and operators will maintain land treatment measures on their farms. The Franklin and the Catahoula Parish Police Juries will operate and maintain structural measures. Estimated annual operation and maintenance cost of structural measures based on current prices is $115,700.

The Louisiana Department of Public Works has agreed to share in the local cost of the structural measures, contingent on the appropriation of funds for this purpose by the Louisiana Legislature. The Sponsors recognize additional funds may be needed to finance project installation and will be responsible for obtaining additional financing as necessary.

WATERSHED RESOURCES

ENVIRONMENTAL SETTING[1]

Physical Data

The East Franklin Watershed is in northeast Louisiana in the eastern half of Franklin Parish, with small areas in the northeast corner of Catahoula Parish and the southeast corner of Richland Parish. It encompasses 184,000 acres in Franklin Parish, 11,500 acres in Catahoula Parish, and 500 acres in Richland Parish. The elongated area is bounded on the east by the Madison-Tensas parish boundary and on the west by a meander line approximately down the center of Franklin Parish to Boeuf River just above the mouth of Deer Creek. The southern boundary generally parallels the parish line in Catahoula Parish and follows the southern drainage divide of Deer Creek on the remaining portion.

The population, based on the 1970 census data, is about 8,900. Approximately 37 percent of this population is classified as rural farm. The remaining 63 percent is rural nonfarm. About 22 percent of this rural nonfarm population lives in the communities of Wisner and Gilbert, and the remainder is scattered throughout the watershed. Winnsboro, the parish seat of Franklin Parish, is about 3 miles west of the central portion of the watershed; and Monroe, the sixth largest city in the State, is approximately 40 miles to the northeast.

East Franklin Watershed is in the Ouachita River Basin of the Lower Mississippi Water Resource Region.[2] About half the watershed is in the Southern Mississippi Valley Alluvium Land Resource Area, and half is in the Southern Mississippi Valley Silty Upland Land Resource Area.[3] A geologic map compiled by Rufus J. LeBlanc[4] shows the watershed as "Recent" braided stream deposits. The Southern Mississippi Valley Silty Upland Land Resource Area portion is a terrace formed by the Mississippi

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1/ All information and data, except as otherwise noted by reference to source, were collected or compiled during watershed planning investigations by the Soil Conservation Service and Forest Service, U.S. Department of Agriculture.

2/ U.S. Department of Agriculture, Soil Conservation Service, Atlas of River Basins of the United States (Washington: U.S. Government Printing Office, 1970), Map. No. 15.

3/ U.S. Department of Agriculture Handbook No. 296, Land Resource Regions and Major Land Resource Areas of the United States (Washington: U.S. Government Printing Office, 1965), pp. 59-60.

4/ Rufus J. LeBlanc, Geologic Map of Louisiana (A map compiled from several sources of data, Baton Rouge, Louisiana, 1948).

River, with a narrow Pleistocene ridge rising some 20 feet above the surrounding terrace. The terrace has a cap of loess. The entire area was formed during the Quaternary System of the Cenozoic Era.

As a basis for conservation planning, the soils in this watershed are grouped in accordance with the Land Capability Classification System.[5/] These groupings are based on the limitation of the soil, risk of damage, and response of crops to treatment. In the capability system, all kinds of soil are grouped at three levels--the capability class, the subclass, and the unit.

Capability Classes, the broadest group, are designated by Roman numerals I through VIII. In class I are soils that have few limitations, the widest range of use, and the least risk of damage when they are used. The soils in the other classes have progressively greater natural limitations. In class VIII are soils and landforms so rough, so shallow, or otherwise so limited that they do not produce worthwhile yields of crops, forage, or wood products. Classes I, II, and III are suitable for cropland; class IV is marginal and class V through class VIII are unsuited for cropland.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, "e" or "w," to the class numeral; for example, IIw. The letter "e" shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; "w" shows that water in or on the soil interferes with plant growth or cultivation.

Soils are grouped according to their distinctive proportional pattern on the landscape. These groupings are called soil associations. A soil association normally consists of one or more major soils and at least one minor soil and it is named for the major soils. The soils in one association may occur in another, but in a different pattern. The principal soil associations are Sharkey-Tensas, Grenada-Calloway-Calhoun, Grenada-Memphis, and Dundee Association.[6/] See General Soil Map on the following page.

The Sharkey-Tensas Association is the dominant association, comprising about 41 percent of the watershed. The soils in this association are high in natural fertility and occur in low, nearly level to gently undulating areas away from the natural levees in the eastern part of the watershed. Where undulating conditions exist, Sharkey soils are in the swales or lows, and Tensas soils are on the ridges. Because of their clayey surface textures, these soils cannot be worked over a wide range of moisture conditions. The native vegetation of this association was mixed hardwoods

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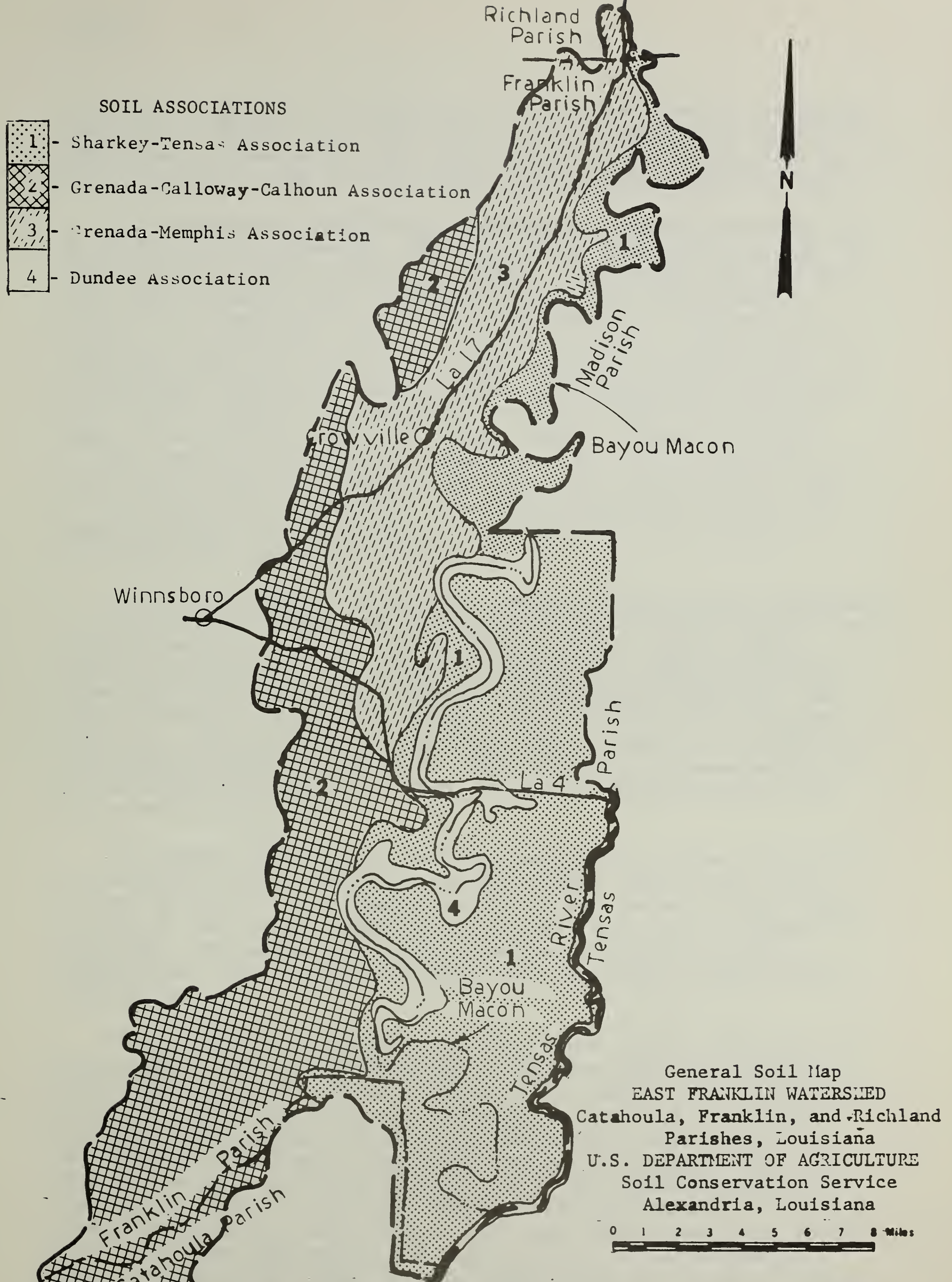
5/ A. A. Klingebeil and P. H. Montgomery, "Land Capability Classification," U.S. Department of Agriculture, Soil Conservation Service. Agriculture Handbook No. 210 (1961), p. 21.

6/ U.S. Department of Agriculture, Soil Conservation Service, "Franklin Parish, Louisiana, General Soil Map," Alexandria, Louisiana, 1971.



General Soil Map
EAST FRANKLIN WATERSHED
Catahoula, Franklin, and Richland
Parishes, Louisiana
U.S. DEPARTMENT OF AGRICULTURE
Soil Conservation Service
Alexandria, Louisiana

Compiled from Soil Conservation Service General Soil Maps of Catahoula, Franklin, and Richland Parishes, Louisiana, April 1974

with dense understory, but these soils are now used mostly for soybean production. Wetness, combined with the clayey texture, is the chief limitation of these soils. The majority of the Sharkey and Tensas soils is in Capability Class IIIw and minor areas are in classes IVw and V.

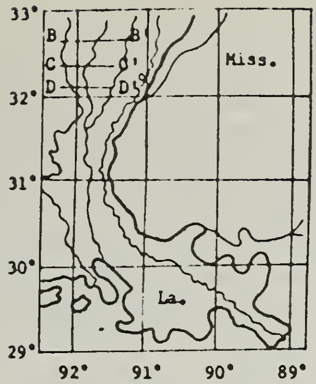
The Grenada-Calloway-Calhoun Association comprises approximately 32 percent of the watershed. These are silty soils that occur on the nearly level to gently undulating uplands. The Grenada and Calloway soils have a compact layer (fragipan) beneath the surface which restricts the movement of moisture within the soil. In level areas, wetness is a limitation for crop production and the soils are in Capability Class IIw. On slopes, they are subject to erosion and are in Capability Class IIe. Calhoun soils are in Capability Class IIIw. They occur in slight depressions in the nearly level areas, and in swales (lows) in the undulating areas. Wetness caused by ponding or slow runoff is the dominant limitation. The natural fertility of the soils in this association is low, but crops respond fairly well to the recommended fertilizers. The native vegetation was pine and mixed hardwoods, but the soils are now used to grow the common agronomic crops suited to the area.

The Grenada-Memphis Association comprises approximately 21 percent of the watershed. These are silty soils that occur on the nearly level to gently sloping uplands. Water perched above a compact layer beneath the surface is the dominant limitation of the Grenada soils. Where these soils are level, they are in Capability Class IIw. On slopes, erosion becomes the dominant problem and they are in Capability Class IIe. Memphis soils are on slopes and are subject to erosion (Capability Classes IIe and IIIe). Both soils in the association are low in natural fertility, but crops respond moderately well to the recommended fertilizer.

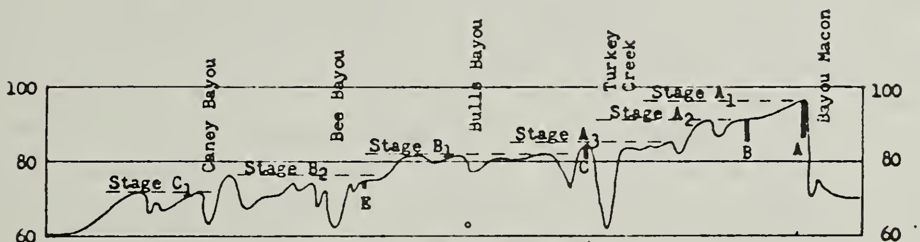
The Dundee Association is a minor association in the bottom land and comprises only 6 percent of the watershed. Dundee soils are on the nearly level to very gently sloping natural levees of Bayou Macon. Wetness is the dominant limitation and Dundee soils are in Capability Class IIw. The native vegetation was mixed hardwoods with dense understories. Now, nearly all these soils are used to grow soybeans, cotton, and corn.

The topography of the bottom land reflects the age, the types of soil material, and the environmental conditions under which the materials were deposited. The elevations of the natural levee along Bayou Macon range from about 75 feet above mean sea level in the northern portion to about 65 feet in the southern portion. From the toe of this natural levee east to the Tensas River, a distance of about 10 miles, elevations are about 10 feet lower. The drainage pattern is the trellis type. It is poorly developed because the area is flat and geologically young. Lakes such as Lake Dean, Little Cow Lake, Middle Lake, and Beeler Lake are in old meander scars of distributaries. Bayous connect these lakes with the Tensas River so that water levels in the lakes fluctuate with water levels in the Tensas River.

GEOLOGIC PROFILES



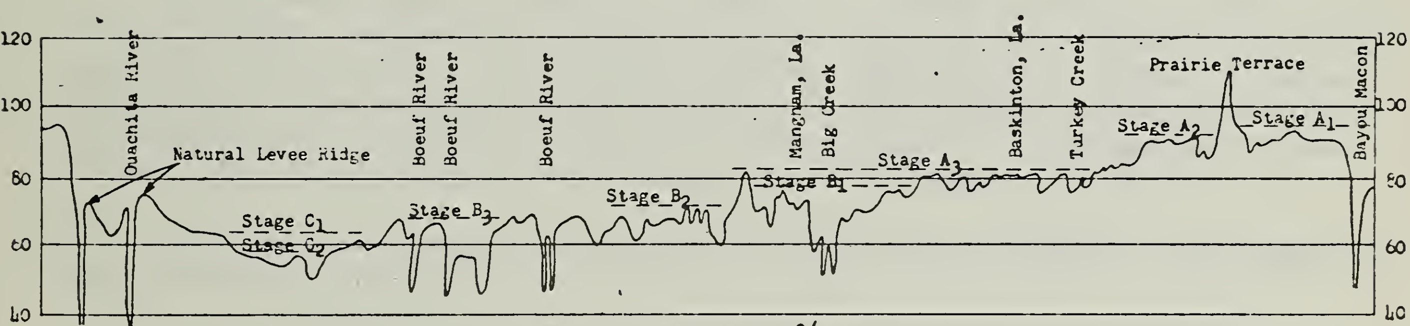
Location Map



Profile along Line B-B' 1/

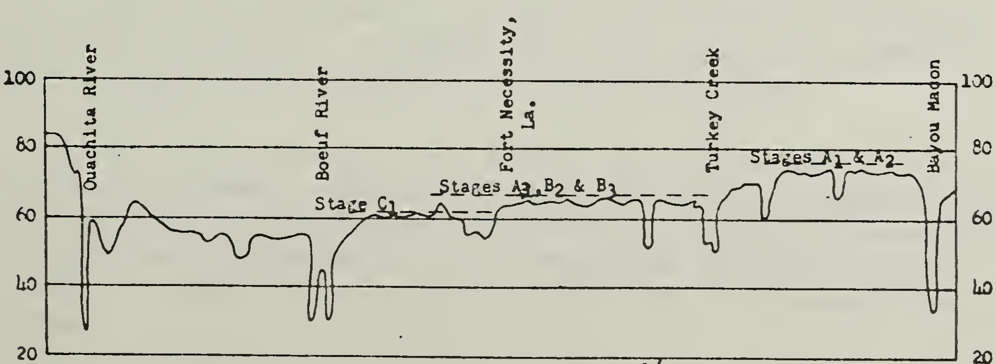
Depth of Loess below Land Surface

Site A - 126" Site C - 45"
Site B - 70" Site E - 12"



Profile along Line C-C' 2/

Relationship of Land Surface to the Geologic
Stages of Development of the Mississippi River



Profile along Line D-D' 2/

Relationship of Land Surface to the Geologic
Stages of Development of the Mississippi River

Source:

1/ Soil Conservation Service, Alexandria, La. "Work by David F. Slusher, 1963.

2/ Geological Investigation of the Alluvial Valley of the Lower Mississippi River, Harold N. Fisk, Ph.D. Mississippi River Commission, 1944.

SETTING

The topography of the upland ranges from nearly level to gently sloping, with the ridge in the northern portion being pronouncedly more steep than the remainder of the upland section. The ridge, situated in a north-south direction, has an average elevation of 105 feet above mean sea level, with a few points being near 130 feet. Within a distance of 2 miles to the east and west, the ridge slopes to elevations of about 85 feet above mean sea level. Ground elevations within a 30-mile distance vary from 65 feet at the southern end to 90 feet at the northern end. The natural drainage is to the south along the ridge, rather than to the east or to the west. The loess mantle is about 10 feet thick at the escarpment near Bayou Macon, and it thins to the west. See geologic profile B-B' on the previous page. The area was created as a series of terraces during the development of the Mississippi River. Stages (A, A2, B1, B2, etc.) shown in the geologic profiles represent geomorphic development of the Mississippi River. See profile along line C-C' and D-D'. The geologic age of the area is interpreted from the terraces. Terraces between stages A1 through B2 are less than 6,000 years old. The extreme youth of the area, the thinning of the loess, and the terrace development account for the southerly drainage. Should the drainage pattern be changed, as would eventually happen under natural drainage pattern development, the area would suffer extreme erosion.

The average annual rainfall is about 52 inches. Seasonal distribution is as follows: winter- 30 percent, spring - 30 percent, summer - 22 percent, and fall - 18 percent. The average annual temperature is about 66 degrees Fahrenheit. The average monthly temperature in January and July is about 50 degrees and 83 degrees Fahrenheit, respectively.[7/] The average frost-free period of 243 days extends from March 9 to November 6.[8/]

Oil, gas, and gravel are produced within the watershed. No commercial clay deposits occur.

Prior to 1935, 32 drilling permits had been issued in Franklin Parish, but there had been no oil and gas production. At the present time, three fields--the Egypt Ferry, Killens' Ferry, and Lamar Fields--are producing; and three have been depleted. In 1967, the value of oil and gas production amounted to $4,119,000. In 1968, this declined to $2,188,000; six exploratory holes were drilled, but these were dry.

At the extreme southwestern end of the watershed, there are approximately 1,000 acres of upland. This is a part of "Sicily Island." Locally, this "island" is capped by Montgomery Terrace Deposits of Pleistocene Age. Gravel pits are located within the watershed in this deposit. Salt domes are in the vicinity of Crowville and Gilbert, but they have not been productive.

7/ U.S. Department of Commerce, Environmental Data Service, Climatological Data, Louisiana Annual Summary 1972 (Asheville: National Oceanic and Atmospheric Administration, 1973), p. 159.

8/ U.S. Department of Commerce, Weather Bureau, Climates of the States, Louisiana (Washington: U.S. Government Printing Office, 1959), p. 6.

The primary and probably the only source of ground water is from The Quaternary Alluvial Deposits. Wells have a potential for yields up to 6,500 gallons per minute. The water is very hard and has a high iron content; however, it is well suited for irrigating crops. A ridge of high chloride content water lies immediately west of the watershed. Although this ridge is located outside the watershed, it could have influence in some wells along the western border.

In Franklin Parish in 1969, 5.62 million gallons of water a day were pumped for irrigation from the alluvial aquifer. The elevation at the base of the freshwater aquifer is approximately 100 feet below mean sea level. The total usage of ground water amounted to 9.16 million gallons per day.

Land use in the watershed is as follows:

Land Use	Acres	Percent
Cropland	117,300	60
Pastureland	28,000	14
Forest Land	36,900	19
Other[a/]	13,800	7
	196,000	100

a/ Includes roads, railroads, communities, lakes, channels, farmsteads, on-farm miscellaneous, etc.

Large tracts of crop and pasture with interspersed forest land plots are typical. The three exceptions are (1) a forested tract of about 10,000 acres located north of Louisiana Highway 4 between Bayou Macon and Big Roaring Bayou, (2) a forested tract of about 1,000 acres located between Bayou Macon and the lower end of Channel M-4, and (3) a forested tract of about 1,000 acres located at Sicily Island.

Southern hardwoods make up the dominant forest in the watershed area. Thirteen percent of the forested area is well stocked[9/] and 70 percent is medium stocked with commercially valuable species. The total acreage of the watershed forest land is classified as 3 percent good quality hardwoods, 95 percent fair quality hardwoods, and 2 percent cypress.

Two plant communities are present in the forested areas. The larger in size, bottom land hardwoods, comprises about 35,900 acres. The other, mixed pine-hardwoods, is approximately 1,000 acres in size and occurs in the extreme southwestern portion of the watershed.

9/ Definitions:
Well stocked - Above 70 percent of the stand is composed of commercially valuable species.
Medium stocked - From 40 percent to 70 percent of the stand is composed of commercially valuable species.

Overstory vegetation in the bottom land hardwood plant community includes hackberry, elm, water locust, green ash, overcup oak, water oak, bitter pecan, Nuttall oak, bald cypress, tupelogum, and willow oak. Understory vegetation consists of greenbrier, palmetto, switchcane, trumpetcreeper, Japanese honeysuckle, blackberry, dewberry, sumac, paspalums, panic grasses, andropogons, various sedges and rushes, ferns, and reproduction from overstory species.

Overstory vegetation found in the mixed pine-hardwood plant community includes Southern red oak, white oak, loblolly pine, white ash, hornbeam, willow oak, water oak, and sweet gum. Understory plants include blackberry, rattan vine, wild grape, sumac, American beauty berry, fringetree, huckleberry, and greenbrier.

Before farming became prominent in this area, the natural drainage system consisted of a pattern of creeks, bayous, and wide natural depressions. The demand for food and fiber generated more interest in the area, and a drainage improvement program was initiated which included enlarging and clearing these natural depressions. Most of the ditches that comprise the present drainage system have been dug and, in some cases, dug more than once. The geometric configuration and alignment of the water courses have been completely changed. Cleaning of these channels over the past 50 years has resulted in the present outlet system of manmade "drainage ditches." The wide, natural depressions of the early drainage pattern have been altered to form the present "ditch system." The photographs on the following page show typical ditch sections.

Boeuf River, Bayou Macon, and Tensas River are the main streams into which the runoff from the watershed discharges; Deer Creek is the principal channel that drains the watershed. The remaining drainage system is manmade ditches dug in wide shallow depressions. A number of bayous and swales in undisturbed wooded areas drain into Bayou Macon and Boeuf River. About 20 years ago, the Louisiana Department of Public Works diverted a portion of Deer Creek into Bayou Macon (see Project Map). Deer Creek was enlarged in two sections - (1) from Highway 15 south of Wisner to Highway 562 northeast of Wisner, and (2) all the portion north of the Bayou Macon diversion.

An inventory of the existing drainage system was made to determine the type of channels and flow characteristics. The inventory showed that 77 percent are manmade or previously-modified channels and 23 percent are natural, unmodified channels. Eight-eight percent of the channels have ephemeral flow characteristics, 9 percent have intermittent flow, and 3 percent have ponded water.

There are 1,706 acres of lakes and ponds that are used for several purposes. Seventy of the ponds are devoted to commercial catfish production. Two of the lakes have project channels draining into them. These are Bayou Macon "cutoff Nos. 2 and 3." The following chart lists the names and approximate size in surface acres of the lakes and ponds in the watershed.

Typical Section of an Enlarged Channel

Typical Section of a Manmade Ditch

Name	Approximate Size in Surface Acres
Twin Lakes	16
Little Lake	2
Moon Lake #1	3
Green Lake	21
East Lake	15
Batese Lake	3
Lake Dean	90
Big Cow Lake	19
Calf Lake	2
Little Cow Lake	15
Middle Lake	6
Moon Lake #2	8
Johnson Lake	3
Beeler Lake	20
Hog Lake	15
Harris Lake	16
Hollywood Lake	27
Bayou Macon Cutoff #3	138
Bayou Macon Cutoff #2	140
Bayou Macon Cutoff #1	238
Unnamed Lakes	44
Farm Ponds (Multiple Use)	75
Catfish Ponds	790
Total	1,706

The Louisiana Stream Control Commission has described portions of interstate streams, coastal waters, and streams discharging into coastal waters in the State according to present use. The Commission has also established quality standards which apply to these streams and their intrastate navigable tributaries and water bodies. Boeuf River and Bayou Macon are the only two streams classified by the Commission which influence or are influenced by this project.

The present uses of water from Boeuf River and Bayou Macon are irrigation, watering of livestock, propagation of aquatic life, recreation, municipal water supply, and carriage of minor amounts of treated municipal and industrial wastes. General Criteria for water quality standards state: "No waste after discharge to the Boeuf River shall create conditions which will adversely affect public health or the use of its water for municipal or industrial supplies, propagation of aquatic life, recreation, agriculture, and other legitimate uses."

Specific criteria for water quality standards as published in "Water Quality Criteria and Plan for Implementation"[10/] are identical for Boeuf

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10/ State of Louisiana, Louisiana Stream Control Commission, Water Quality Criteria and Plan for Implementation (Unpublished report, 1968) pp. 69-72.

River and Bayou Macon, except for the pH range. The pH range for Boeuf River is from 6 to 8.5 and for Bayou Macon is from 6 to 9. Identical criteria as published are:

Dissolved Oxygen	-	Not less than 50 percent of saturation at the existing water temperature.
Temperature	-	Not to be raised more than 2 degrees centigrade above normal ambient water temperature, nor to exceed a maximum of 35 degrees centigrade.
Oils	-	There shall be no slicks of free or floating oil present in sufficient quantities to interfere with the designated uses, nor shall emulsified oils be present in sufficient quantities to interfere with the designated uses.
Toxic Materials	-	None present in quantities that alone or in combination will be toxic to animal or plant life. In all cases, the level shall not exceed the TLM 48/10.[a/]
Foaming or Frothing Materials	-	None of a persistent nature.
Coliforms (MPN/100 ml)[b/]	-	The monthly median shall not exceed 1600/100 ml, nor shall this count exceed 5420/100 ml in more than 10 percent of the samples in any 1 month.
Other Materials	-	Limits on other substances not heretofore specified shall be in accordance with recommendations set by the Louisiana Stream Control Commission or by the Louisiana State Board of Health for municipal raw water sources.

a/ Median tolerance limit signifying the concentration that kills 10 percent of the test organisms within 48 hours.

b/ Most probable number.

Wetlands, as defined in USDI Circular No. 39,11/ comprise 4,340 acres. Of this total, 3,265 acres are Type 1 wetlands, 4 acres are Type 4 wetlands, 430 acres are Type 5 wetlands, and 641 acres are Type 7 wetlands. Following is a summary of the wetlands data:

Type	Description	Acres
1	Seasonally flooded hardwoods	3,265
4	Inland, fresh marsh	4
5	Open lakes and ponds up to 10 feet deep	430
7	Cypress and tupelo gum brakes	641
Total		4,340

Economic Data

Public land consists of 155 acres administered by the Franklin Parish School Board and 120 acres administered by the Tensas Basin Levee District. All other land is privately owned.

There are three broad categories of industries in the economy of the region. In the first are the basic industries such as farming, mining, and forestry which are based on natural resources. The second category includes the processing industries such as cotton gins, grain elevators, petroleum refining plants, and lumber mills, which depend on the basic industries. The third category includes the service industries such as wholesale and retail stores, communications, transportation, medicine, etc., which are based on the other two industries as well as their own members.12/

Since forestry resources have been reduced and mineral deposits are limited, the major basic industry in the watershed is farming, as indicated by the following statistics. These statistics, developed from the 1970 census data for the rural farm and rural nonfarm segments of the Franklin Parish population, show that the labor force consists of about 2,200

11/ U.S. Department of the Interior, Fish and Wildlife Service, Wetlands of the United States, Circular No. 39 (Washington: U.S. Government Printing Office, 1956), pp. 20-22.

12/ Gerald A. Doeksen, Robert E. Daughtry, and Charles H. Little, "Multiplier Effects of Agriculture and Other Industries", OSU Extension Facts, Science Serving Agriculture No. 808 (Stillwater: Oklahoma State University), pp. 808 and 808.1.

persons. Of these, about 7 percent are unemployed; about 26 percent of the labor force are employed in agriculture, and about 4 percent are employed in other natural resource base industries such as mining, forestry, or fisheries. About 20 percent of the labor force is employed in construction and manufacturing. The remaining employed labor force (43 percent) is occupied in the service-type industries. Median income in the watershed was approximately $3,750 in 1970.

The major farm and ranch enterprises are soybeans, cotton, and cattle. The farm-related industries include several cotton gins, a feed mill, a food canning plant, a sweet potato warehouse, and an agricultural equipment fabricator. Several agricultural supply houses, a livestock auction barn, a cotton compress and warehouse, and other related businesses are located in the nearby town of Winnsboro.

Crops grown in the area include cotton, soybeans, corn, rice, grain sorghum, wheat, and hay. Pasture plants include Common bermudagrass, Coastal bermudagrass, dallisgrass, bahiagrass, fescue, ryegrass, and clover. Soybeans and cotton are the major crops. The without-project yields in the water problem area are 22 bushels of soybeans and 614 pounds of lint cotton per acre. Yield averages for the entire watershed are about 29 bushels of soybeans and 753 pounds of lint cotton per acre.

Average merchantable volume in sawtimber-size trees for the watershed is 1,170 board feet per acre of hardwoods, and 135 board feet per acre of cypress. Average merchantable volume in cordwood size trees is 167 cubic feet per acre of hardwoods and 9 cubic feet per acre of cypress. Another 197 cubic feet per acre of sound hardwood material is present in trees of poor quality.

Land values for agricultural purposes range from an estimated $200 per acre for poorly-drained soils to $400 per acre for well-drained soils. These values depend on location, soil type, and degree of conservation measures applied.

Approximately 500 miles of State and parish roads in the watershed provide good access; about 100 miles are hard surfaced and 400 miles are graveled. Parts of some gravel roads are under water after heavy rainfall. The railroad providing service has loading facilities at several points.

About 820 farms average 190 acres in size. About 90 percent are family-type farms; the remaining 10 percent are considered large commercial-type farms.

Fish Resources

Lake Dean, other natural lakes, farm ponds, three manmade "cutoffs" on Bayou Macon (see Project Map, Figure 7), 7 miles of ponded water channels, and Bayou Macon, Tensas River, and Boeuf River contain the major fisheries. Of lesser importance are 22 miles of intermittent

flow channels. There are no known "threatened" fish species in the project area.[13/]

The "cutoffs" are U-shaped bends, formerly the streambed of Bayou Macon, that have earthen levees separating them from Bayou Macon. Fish populations in two of the three "cutoffs" were sampled using rotenone during September, 1973 in cooperation with the Louisiana Wild Life and Fisheries Commission. Results from these samples indicated a standing crop of 294 pounds per acre for Bayou Macon "cutoff No. 2" and 195 pounds per acre for Bayou Macon "cutoff No. 3." The remaining lakes and multiple-use ponds not sampled have an estimated standing crop of 225 pounds per acre. Annual production from the commercial catfish ponds is about 1,500 pounds per acre. Important game and commercial fish species present in the lakes and ponds are largemouth bass, crappies, bluegill, redear sunfish, carp, and catfishes.

Bayou Macon, Tensas River, and Boeuf River are perennial streams partly within or adjacent to the project area. The diversity of fish species in these three streams is poor. The fish population is composed primarily of commercial species including carp, buffalo, gar, shad, and catfish. Few game fish are present. The three streams have an estimated standing crop of 100 pounds per acre.

Presently, water quality for fish production is poor in Boeuf River, Bayou Macon and the Tensas River. Previous disturbances, the intensively-farmed drainage areas, and erosion of fine-grained soils have resulted in conditions that are not favorable for productive fisheries. Consequently, the majority of the fish population is composed of commercial species. The tabulation on the following page illustrates some water quality parameters that are limiting fish production in Bayou Macon and Tensas River.

Bayou Macon "cutoff No. 3" contains an excellent fishery. A fish population sample taken in September 1973 revealed a standing crop of 195 pounds per acre. Game fish composed 45 percent of the standing crop. The fish population is "in balance" according to species composition and age classes.

Bayou Macon "cutoff No. 2" contains an "out-of-balance" fish population. The sample taken in September 1973 showed that gizzard shad composed 88 percent or 259 pounds of the total sample. Game fish made up only 26 pounds or 9 percent of the total sample. Largemouth bass were absent from the sample. Chain pickerel was the only species of predatory game fish present.

13/ Robert R. Miller, "Threatened Freshwater Fishes of the United States," Transactions of American Fisheries Society, No. 2 (Kansas: Allen Press, 1972), pp. 239-252.

Yearly Average Values for Selected Water Quality Parameters, East Franklin Watershed

Year	Turbidity	Dissolved Solids	Suspended Solids	True Color
	milligrams per liters			units
		BAYOU MACON[a/]		
1968	126	235	116	32
1969	88	226	90	26
1970	162	265	156	33
1971	134	332	125	40
1972	81	268	110	50
1973	85	217	89	57
		TENSAS RIVER		
1968	106	245	80	38
1969	77	208	112	30
1970	197	269	150	43
1971	86	275	64	53
1972	85	224	93	42
1973	68	220	81	70

a/ Unpublished data, Louisiana Wild Life and Fisheries Commission, Division of Water Pollution Control

Ponded water channels comprise about 7 miles and 21 surface acres. Fishery values are poor, with standing crops estimated to be 75 pounds per acre. Composition of the fish population is similar to that of the Boeuf and Tensas Rivers and Bayou Macon.

Intermittent flow channels comprise about 22 miles and 59 surface acres. Almost all these are previously modified ditches. The fishery values of these are low because flow conditions are poor, bank cover is inadequate, and water quality is poor. These channels have estimated standing crops of 20 pounds per acre during periods of flow; commercial species are dominant.

Channels with ephemeral flow are important to the production of fish food organisms such as crawfish and larval forms of insects but do not support fisheries since water is present only during periods of surface runoff. The following data summarize the fisheries by categories:

FISHERIES DATA BY CATEGORIES

Name	Acres	Standing Crop	Pounds
Catfish ponds	790	1,500 lbs./acre	1,185,000
Lakes and Ponds (Multiple Use)	916	225 lbs./acre	206,100
Outlets	735	100 lbs./acre	73,500
Ponded Water Channels	21	75 lbs./acre	1,575
Intermittent Flow Channels	59	20 lbs./acre	1,180
Total	2,521		1,467,355

The fisheries are utilized heavily by local fishermen. The economy is boosted through sales of boats, motors, fishing tackle, gasoline, and other items. About 1,300 resident fishing licenses were sold in Franklin Parish during the 1970-71 fishing season.[14/] This represents 11 percent of the total population between the ages of 16 and 60 years. Residents under 16 years or over 60 years, and residents using a cane pole, or rod without a reel and artificial lures are not required to buy a license to fish.

Access to the fisheries is good except for several small lakes along the Tensas River. These lakes do not have a good all-weather road to them. Two public launching ramps are available on the Tensas River, one ramp on Bayou Macon "cutoff No. 1," and one ramp on Bayou Macon "cutoff No. 3." Several road crossings on the three outlets provide places to launch small fishing boats. Most multiple-use ponds have all-weather roads for access, and permission to fish usually can be obtained from the landowner.

Wildlife Resources

Forest land habitat comprises about 36,900 acres within the watershed. This vegetative ecosystem supports some of the highest wildlife populations in the State. This acreage is in bottom land hardwoods except about 1,000 acres in the southwestern part of the area. Forest game species associated with this habitat include white-tailed deer, wild turkey, gray and fox squirrels, and swamp and cottontail rabbits. Many nongame species use the forested areas for food and cover. Except for the three large forested tracts listed under "Physical Data", the forest land occurs in small blocks where almost all the good quality mast trees have been removed.

Open land, which includes pastureland and cropland, totals 145,300 acres. It is utilized by open land game species including the bobwhite quail, mourning dove, and cottontail rabbit as well as numerous nongame birds and mammals. Even so, populations of quail, doves, and rabbits are below the potential carrying capacity. This is a situation caused by a lack of winter cover, a lack of year-round food supply, and for quail, a lack of nesting cover. Dove populations could be expected to be high in early fall and winter. However, in late fall (October), populations are reduced. The tabulation on page 21 gives the current populations of forest and open land game species.

14/ State of Louisiana, Louisiana Wild Life and Fisheries Commission, 14th Biennial Report 1970-71 (New Orleans: Louisiana Wild Life and Fisheries Commission, 1972).

Typical Open Land Wildlife Habitat

Typical Forest Land Wildlife Habitat

CURRENT ESTIMATED POPULATIONS OF GAME SPECIES

East Franklin Watershed[a]

Species	Habitat Type	Acres	Number Per Acre(s)	Total in Watershed
Dove	Open Land	145,300	1/6	24,200
Quail	Open Land	145,300	1/50	2,900
Squirrel	Forest Land	36,900	1/1.5	24,600
Deer	Forest Land	36,900	1/20	1,845
Rabbit	Forest Land and Open Land	182,200	1/10	18,200
Waterfowl (Resident)	Forest Land, Open Land, and Water Areas	183,400	1/350	524
Waterfowl (Migratory)	Forest Land, Open Land, and Water Areas	183,400	1/15	12,226
Wild Turkey	Forest Land	36,900	1/100	370

a/ Data developed in cooperation with Louisiana Wild Life and Fisheries Commission.

Other common mammals, birds, reptiles, and amphibians present are:

(1) Mammals - mink, beaver, nutria, raccoon, opposum, bobcat, striped skunk, coyote, gray fox, cotton rat, and armadillo.

(2) Birds - mallard, blue-winged teal, pintail, gadwall, common crow, pileated woodpecker, red-headed woodpecker, downy woodpecker, blue jay, belted kingfisher, barred owl, screech owl, brown thrasher, Eastern bluebird, Eastern meadowlark, Louisiana heron, yellow-crowned night heron, little blue heron, red-shouldered hawk, red-tailed hawk, and house sparrow.

(3) Reptiles and amphibians - western cottonmouth, black rat snake, cane brake rattlesnake, Eastern garter snake, copperhead, king snake, bullfrog, Southern leopard frog, common snapping turtle, smooth soft-shell turtle, stinkpot turtle, red-eared turtle, chicken turtle, alligator snapping turtle, green anole, five-lined skink, ground skink, and Eastern glass lizard.

Previously listed water areas are utilized by resident and migratory waterfowl. About 4,340 acres of wetlands also furnish habitat for waterfowl. The wetland types listed on page 15 form the nucleus of the waterfowl habitat. Wetlands are used by waterfowl for feeding, resting, and roosting; they serve as brood habitat for resident wood ducks. Other values of wetlands include the recharge of ground water, the retention of surface water for farm uses, the stabilization of runoff, the reduction or prevention of erosion, the production of timber, the creation of fire-breaks, and outdoor laboratories for students studying ecology.[15/]

Several "endangered" species, those which are on the verge of extinction, could possibly occur or be occasional visitors in the project area. In this category are the Southern bald eagle, Florida panther, Bachman's warbler, and American ivory-billed woodpecker. Although the black bear is not on the list of "endangered" species, it is considered rare in Louisiana and could possibly occur in the watershed.[16/] There are no "threatened" plants listed for Franklin Parish from available literature. The "threatened plant," silky camellia, has been reported from Catahoula Parish.[17/]

Recreational Resources

A 1970 inventory conducted by the Louisiana State Parks and Recreation Commission lists 18 recreational sites for Franklin Parish. According to the Bureau of Outdoor Recreation's land classes, 17 of these are general recreation sites and 1 site is a historical and cultural exhibit. Eight of these are located in the watershed. These consist of 6 schools having combinations of baseball, football, basketball, tennis, and volleyball facilities; a livery of about 12 boats on Lake Dean; and 2 boat ramps on Tensas River.

Public access to outdoor recreational facilities is available, but use is moderate. The road leading to the boat livery on Lake Dean is a graveled, all-weather road. Four public boat launching ramps are available--two on the Tensas River, one on Bayou Macon "cutoff No. 1," and one on Bayou Macon "cutoff No. 3." One ramp on the Tensas River is near the confluence of Channel M-20, and the other is at the Louisiana Highway 4 crossing. The ramp near the confluence of Channel M-20 is constructed of concrete, but the access road is unimproved and almost impassable when wet. The ramp at the Highway 4 crossing is a gravel ramp that does not provide all-weather access.

15/ U.S. Department of the Interior, Wetlands, loc. cit.

16/ U.S. Department of the Interior, Fish and Wildlife Service, Threatened Wildlife of the United States, Resource Publication 114 (Washington: U.S. Government Printing Office, 1973), pp. 5-203

17/ Unpublished Threatened Plant List for Louisiana, Soil Conservation Service, 1974.

Archaeological, Historical Values, and Unique Scenic Areas

Local inquiries and investigations revealed no unique scenic areas. Before surveys began, the Curator of Anthropology at Louisiana State University had records pertaining to 26 archaeological sites in the watershed. Only 10 of the sites have been classified. These sites are the remains of three villages, four mounds, and three villages with associated mounds. Neither the National Register of Historic Places, the Curator of Anthropology, nor the Louisiana Historic Preservation and Cultural Commission identified places of historical importance in or near the watershed areas.

An archaeological survey was conducted by Northeast Louisiana University to locate prehistoric and historical remains along specified drainage channels within the East Franklin Watershed. Standard archaeological survey techniques were employed and the sites were recorded in the trinomial system used by most archaeologists in the United States. Specific locations of sites are not included in the text but the information is on file in the Geosciences Department of Northeast Louisiana University and with the Soil Conservation Service in Alexandria, Louisiana.

Survey efforts were hampered by dense vegetation and deep alluvial deposits. In some areas, archaeological remains will be exposed only if overburden is removed.

A total of 34 sites were encountered by the survey team along or near areas of proposed works. Of these, 10 are situated in Catahoula Parish and 24 are in Franklin Parish.

Soil, Water, and Plant Management Status

Soybeans became a popular crop in the watershed about 1962. Planted acres have increased from about 10,000 acres in 1962 to approximately 77,000 acres in 1971. This increase has caused a reduction in forest land and pastureland. Since 1958, approximately 37,000 acres of forest land have been cleared. The remaining 36,900 acres of forest land, with the exceptions of a 10,000-acre tract and two 1,000-acre tracts, are privately-owned farm wood lots of less than 200 acres. The bottom land hardwood area in north Louisiana is comprised of about 5,627,000 acres. In 1969, land clearing had reduced the acreage in bottom land hardwoods to about 2,522,000 acres. Bottom land hardwoods were removed at a rate of 111,235 acres per year between 1962 and 1968.18/

18/ Richard K. Yancey, The Vanishing Delta Hardwoods and Their Wildlife Resources (A Paper Presented at the Governor's Seminar on the Mississippi Delta Hardwoods, Little Rock, Arkansas, 1969), p. 4.

SETTING

Soil and water conservation plans have been prepared for 225 farms covering about 54,000 acres. Approximately 90,500 additional acres, representing 440 farms, have received assistance from the District. An estimated 23 percent of the needed conservation measures have been applied. Land treatment has been applied to problem areas as well as nonproblem areas. During the last 10 years, landowners have applied measures costing approximately $1,381,000 (see table 1A). Much of this was applied in water problem areas.

The Northeast Soil and Water Conservation District and the Franklin Parish Chamber of Commerce are involved in a public program titled, "Let's Improve Franklin's Environment" (LIFE). The objectives of this community program are (1) develop and use resources, (2) make people aware of problems, (3) seek solutions, and (4) enjoy the benefits of a clean, bountiful environment.

Problem areas have been identified and action committees created. Committees have been created for (1) erosion control, (2) waste disposal, (3) roadway cleanup, (4) private property appearance, (5) building and housing improvement, (6) recreation and wildlife area improvement, (7) old car disposal, (8) beautification, (9) youth education, (10) drainage and flood prevention, (11) air and noise control, and (12) public relations.

Accomplishments of these committees include (1) removal of over 100 old car bodies, (2) establishment of planters in the town of Winnsboro, (3) sponsoring LIFE Essay and Poster Contest in public schools resulting in about 400 essays and 900 posters, (4) sponsoring parades in three towns as a kick-off for LIFE DAY, and (5) distribution of about 3,000 LIFE bumper stickers and 15,000 LIFE brochures. Some planned activities include (1) another LIFE DAY with parades in three of the parish's towns, (2) removal of more old car bodies, (3) planting crepe myrtles along highways for beautification, and (4) support of a 2-mill tax for establishment of a solid waste disposal system.

Both soil and water conservation districts are actively involved in promoting conservation. Through the use of a monthly newsletter, radio and television announcements and programs, and newspaper articles, the Districts announce important activities and publicize results. Examples of recent activities are:

(1) participating in the Goodyear Soil Conservation Awards program,

(2) participating in the Soil Stewardship Week observance,

(3) attending the Louisiana Banker-Farmer Conservation Tour,

(4) assisting Future Farmers of America to prepare for the soil judging contest,

(5) attending a field day on minimum tillage, and

(6) continuing to sponsor and work with the Boy Scouts in establishing a Conservation Resource Education Project.

The Districts work closely with the district conservationists of the Soil Conservation Service in establishing priorities of work. As Sponsors of this watershed project, the Districts are actively involved in planning at several levels.

The Louisiana Forestry Commission, in cooperation with the U.S. Forest Service through the various Federal-State cooperative forestry programs, is providing forest management assistance, forest fire prevention and suppression, distribution of planting stock and forest pest control assistance to private landowners. There are no lands administered by the U.S. Forest Service within the watershed.

WATER AND RELATED LAND RESOURCE PROBLEMS

Land Treatment

The soils in the bottom land have low erosion rates when undisturbed. However, if they are disturbed and left bare during periods of high rainfall, they are erodible. The soils in the loessial terrace are highly erodible. The sloping loessial soils erode more easily and need more protection by conservation measures than those nearly level. Presently, there are 1,200 acres being cultivated on slopes greater than 5 percent that need conservation measures to reduce erosion.

Because of the generally flat terrain, high rainfall, and very slowly permeable soils (in the bottom land), a severe wetness problem exists on the cropland and pastureland. Many of these lands have adequate on-farm drainage systems, but lack sufficient outlets for these systems. Because of the undulating conditions in some areas and insufficient outlets, the on-farm drainage systems do not function properly. On the gently undulating areas, conservation measures such as land smoothing and drainage land grading are necessary to assure the benefits of the existing and needed drainage systems.

Floodwater Damage and Inadequate Drainage

Flooding and drainage problems in flatland portions are related and inseparable. For this reason, the discussion of problems in these two categories is combined.

About 17,000 acres in the loessial terrace do not sustain damages from floodwater and inadequate drainage. However, runoff from these small noncontiguous areas contributes to the water problem of other areas.

About 60 percent of the 52 inches of average annual rainfall occurs during the winter and spring months, and about 40 percent occurs during the summer and fall months. Damaging, out-of-bank flows occur in the flatland portions of the watershed about four times a year on the average. For the 48-hour duration storm, a rainfall of 3.4 inches could be expected twice a year, 6 inches once in 3 years, and 9.4 inches once in 25 years. Although damages from the small, frequent storms are meager compared to damages from the large, less frequent storms, the aggregate damages from the small storms over a period of years are greater.

Some areas of the watershed are subject to backwater flooding. In the loessial terrace soils, these areas are located along the lower end of Deer Creek (Channel M-1). In the bottom land soils, these areas are located adjacent to the Tensas River. In 1973, an estimated 24,000 acres of crop-land and pastureland experienced backwater flooding from conditions which

are expected to occur once in 25 years. The backwater usually recedes in time for late crops such as soybeans or grain sorghum to be planted and harvested. Almost all the cropland and pastureland in this area is in Capability Class IIIw.

One of the problems of the low-lying land is inadequate major drainage outlets. Inadequate outlets are causing increased costs of production, increased levels of risk, reduced efficiency of farm equipment, and reduced quality and quantity of harvested crops. Local organizations, in cooperation with the Louisiana Department of Public Works, have reduced the problems of inadequate outlets; but funds have not been available to provide adequate systems for all areas. Some landowners and operators have installed on-farm and group drainage systems with the help of the Northeast and the Catahoula Soil and Water Conservation Districts, but the complete system of outlets for these smaller systems cannot dispose of the excess water properly.

The drainage area that is served by an estimated 238 miles of channels has been identified by the Sponsors as areas with inadequate drainage and flood problems. The channels are classified according to the type of channel and flow condition. The classifications are as follows:

Type of Channel		Miles
Well-defined natural channel		54
Previously-modified or manmade channel		178
Nonexisting or nondefined channel		6
	Total	238

Flow Characteristics		Miles
Ephemeral		209
Intermittent		22
Ponded water		7
	Total	238

Soybean lands best illustrate the severity of the flooding and wetness problems since they represent the largest acreages and the soybean crops suffer the most damages. Rainfall is highest in winter and spring and lowest in late summer and early fall. Relatively little land preparation can be accomplished in early spring because large portions of the land are wet. When the better-drained portions of some fields are ready to plow, the poorly-drained portions are too wet. Work can be done on only the dry portions, but often, this is not economical. If the wet portions are plowed, soil may clog or the machinery might stall in the mud, which causes extra expenditures of

Low soybean plant populations in wet areas are typical.

Water standing on cultivated land because the outlets for on-farm drainage systems are inadequate.

time and money and excessive wear and tear on the machinery. If the entire field is plowed with some portions wet, reworking may be necessary to put the field in good tilth.

If adequate plant populations are established in early spring, water damage to the crop from late spring rains may occur, causing replanting or loss of the crop. Consequently, much planting is delayed until late June or early July. Since June is a dry month, a good plant population is difficult to establish because a dry soil hinders seed germination.

Since the root systems of late soybeans (soybeans planted late) are not developed as extensively as that of early soybeans (soybeans planted early), their growth is limited more by moisture deficiencies during the dry months of August, September, and October. Usually, late soybeans are not ready for harvest until November or December when the average rainfall exceeds the average rainfall for September and October by 20 percent. (September and October would be the normal harvest season for early soybeans.) Thus, much of the late soybean harvest is delayed or performed under highly unfavorable conditions.

When wetness causes delays in harvesting, soybeans often mildew in the pod and retain more moisture than is desirable. The longer harvest is delayed, the greater the loss from pods shattering. When the ground is wet, the cutter bar of the harvester cannot be maintained at the proper level because the machine sinks and bogs. Consequently, soybeans that would have been harvested are lost in the field. On wet land, harvested beans have to be hauled to the truck from the field by tractor and grain cart because the combine cannot empty directly into the truck. Overall, harvesting under adverse wet conditions is more costly and more time consuming.

A research report entitled The Effects of Production Practices on Soybean Yields, Costs and Returns in the Mississippi River Delta of Louisiana, published by the Department of Agricultural Economics and Agribusiness of Louisiana State University, describes the problem in more quantified terms. One of the key points made in this study is that there seemed to be a direct relationship between yields per acre and planting dates, soil types, surface and subsurface drainage, and land forming. Low-yield producers had less favorable soil types, poor drainage, and fewer land forming practices, and they planted a greater percentage of soybeans at a later date than did high-yield producers. The tabulation on the following page is a summary of production practices considered in the study.

Several important implications from the summary of the study are as follows:

(1) that the number of acres of soybeans produced was not a factor limiting the yield of soybeans for any group;

A Percentage Comparison of Production Practices for Soybeans by Yield Groups, Mississippi River Delta Area, Louisiana, 1970

Item	Unit	Yield Group		
		Low	Medium	High
Average number of acres planted	acres	597.4	815.4	636.6
Heavy soil type	percent	78.1	70.2	50.5
Very good surface drainage	percent	6.7	9.6	25.7
Very good subsurface drainage	percent	0	4.8	3.7
Land forming practices	percent	7.6	15.4	29.3
Liming	percent	12.4	34.6	22.9
Fall plowing	percent	72.4	73.1	91.8
Deep tillage	percent	48.6	55.8	64.2
Planting on a bed	percent	38.1	51.0	50.5
Planting on 40-inch rows	percent	50.5	37.5	57.8
Completed planting by May 31	percent	59.4	86.5	85.3
Double-disc opener planter	percent	51.4	38.5	46.8
Sword-type planter	percent	48.6	61.5	53.2
Use of pre-emergence herbicides	percent	74.3	81.7	80.7
Four cultivations	percent	27.6	41.3	31.2
Use of post-emergence herbicides	percent	40.0	43.3	41.3
Hand hoeing	percent	32.4	50.0	57.8
Flame cultivation	percent	3.8	7.7	4.6
Use of lay-by herbicides	percent	10.5	13.5	5.5
Complete weed control program	percent	9.5	17.3	21.1
Fields free of weeds	percent	25.7	37.5	59.6
Use of insecticides	percent	33.3	39.4	22.0
Average or better weather conditions	percent	10.5	37.2	53.2

(2) that low-yield producers can increase average yields and returns through increased crop rotation programs, primarily by helping control weed infestation;

(3) that low-yield producers can increase yields and returns through more intensive drainage and land forming practices;

(4) that low-yield producers with careful variety selection based on soil type, date of planting, maturity dates, and specific soil physical characteristics can increase yields and incomes;

(5) that low-yield producers can generally increase yields by planting approximately 1 bushel of certified, high quality seed per acre before May 31, and that early maturing varieties, (Hill, Dare, and Hood) suffer more from later planting dates than medium and late maturing varieties (Davis, Bragg, Lee, and Lee 68);

(6) that low-yield producers can increase yields and returns by a more complete weed control program (both chemical and conventional) where weed and grass infestation is a problem; and,

(7) that low-yield producers using four-row equipment can lower costs of production by using six-row equipment if they have at least 600 to 800 acres and if the age of present four-row equipment, timeliness of operation, labor availability, et cetera, would warrant the change.

Other crops are affected in a similar manner, although not as adversely. Pasture is affected; growth of grasses is slowed and the grass is unpalatable. Water tolerant weeds are difficult to eradicate. Stocking rates are not kept at full potential because grazing days are lost. Extra expenses are incurred in either moving the cattle or hauling hay and feed to them.

Roads require additional maintenance because of flooding. Extra gravel, fill materials, equipment, time, and labor are needed to keep roads open and passable. When roads are flooded, sections of schoolbus routes have to be omitted. Children then either miss school or have to be transported to the nonflooded roads by other means.

Indirect damages associated with flooding include any losses from flooding not directly related to it. Examples are traffic detours and extra expenses incurred as a result of delays in obtaining feed and other farm supplies. Also, market losses to farm products can be attributed to delays in transportation as a result of flooding.

Total average annual inseparable damages attributed to floodwater and impaired drainage amount to $1,047,200. Of this amount, $387,400 was allocated to drainage and $659,800 was allocated to flood prevention.

In addition, average annual road damages are $51,600 and indirect floodwater damages are $66,800.

Erosion Damage

Sheet erosion, the dislocation of soil particles by the impact of raindrops and their removal by runoff, is the main cause of soil loss. The rate of sheet erosion is dependent on the following factors:

1. amount and intensity of rainfall

2. the cover or protection from raindrop impact

3. the physical character of the soil

4. the percent slope of the land and the uninterrupted length of the slope

Within the watershed, two of the above factors do not vary. The average amount and intensity of rainfall are similar and the vegetative cover within land uses is the same.

Variations in soils and slopes exist within the watershed. Two types of deposition account for the differences in soil materials found in the watershed: (1) loess and loess-derived soils of the upland, and (2) alluvium of the bottom land. The loess-derived soils are dominated by silt-sized particles and are more susceptible to erosion than soils of the bottom land which are dominated by clay-sized particles. The soils in the Southern Mississippi Valley Silty Upland Land Resource Area are derived from loess, with average slopes ranging from 1 to 1.5 percent. The bottom land soils in the Southern Mississippi Valley Alluvium Land Resource Area are primarily clays, with an average slope of approximately 0.5 percent.

Sheet erosion removes 866,750 tons of soil each year within the watershed, an average of 4.4 tons per acre. Monetary damages from sheet erosion are low. The photographs on page 33 illustrate the susceptibility of the soils to sheet erosion.

While soil losses from gully, streambank, and roadside erosion occur, they are in scattered locales and are insignificant when compared to the soil losses from sheet erosion.

Sediment Damage

Two general types of agricultural damage due to sediment occur: (1) sediment deposited at the lower ends of fields as a normal function of sheet erosion, and (2) sediment dropped from floodwater on agricultural land. The first type is illustrated by the lower photograph on page 33

Inadequate crop residue permits excessive sheet erosion.

The light area along the tree line is sediment from sheet erosion caused by heavy rains before the winter cover crop could be established.

Monetary values are not normally ascribed to this type damage since the reduction of this damage is a land treatment benefit. The second type, sediment deposited from floodwater, is illustrated by the photograph on page 35. Due to the scattered occurrence, limited amounts, fine texture and fertility of this sediment, the damages from this type of deposition were grouped with the other floodwater damages and no monetary values were assigned.

Other types of sediment damage occur in the channels. One of the more common problems is sediment accumulation in channels as shown in the photograph on page 36. These deposits create areas where willows will grow, causing a reduction in the channel capacity. Channel deposition of this nature is frequently the result of improper protection where water enters the channel from the side. Removal of the sediment is necessary for the channel to regain its capacity. These conditions increase the cost of operation and maintenance for the system.

At the present time, the average annual sediment delivered to Boeuf River, Bayou Macon, Tensas River, and other locations on the watershed boundary amounts to approximately 305,000 tons. The following tabulation shows this:

Annual Sediment
East Franklin Watershed

	Sediment Delivered To	
	Major Outlet	Other Locations
	--------tons per year-----------	
Boeuf River	67,250	14,000
Bayou Macon	162,350	--
Tensas River	61,200	--
Total	290,800	14,000

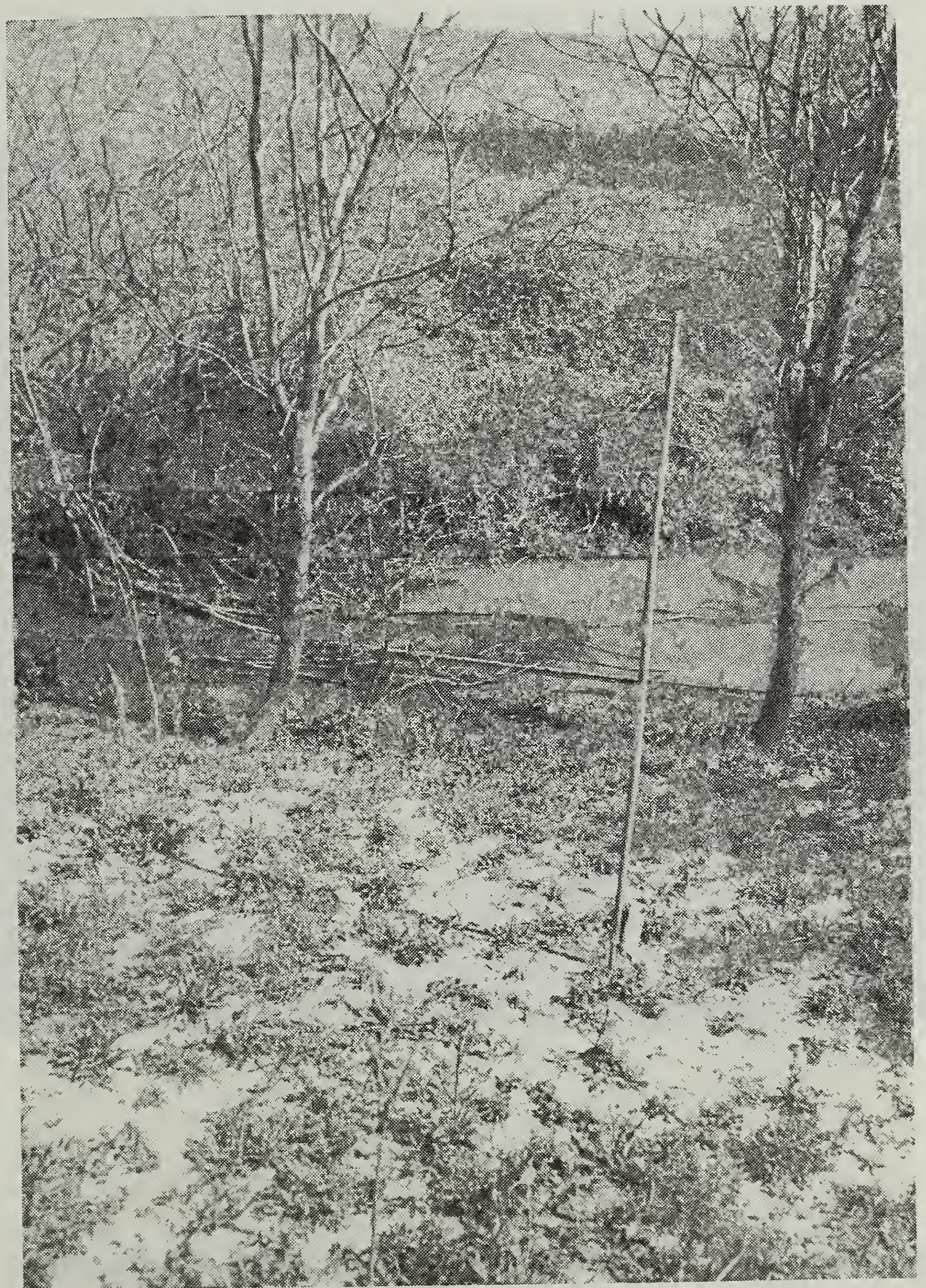
The computed average annual sediment yield concentration amounts to 687 mg/l. This figure includes the colloidal sediment, and the mud flow at the bottom of the channels. The computations are based on the total average amount of sediment being delivered and on the runoff from the watershed. Analyses were made on two water samples taken from the lower portion of Deer Creek and Bayou Macon "cutoff No. 2." Those data showed suspended sediment concentrations of 310 mg/l in Deer Creek and 19 mg/l in Bayou Macon "cutoff No. 2." Suspended sediment concentrations will show wide variations due to the following factors:

1. season of the year

2. antecedent moisture

3. duration and intensity of the last rain

4. portion of a storm hydrograph which was sampled



Sediment deposited on fescue pasture along Channel M-2. This type of sediment damage is local in extent and usually minor.

Sediment deposit in Channel M-2. This deposition is very recent. Woody growth will start soon on this deposit and severely restrict the flow-carrying capacity of the channel.

PROBLEMS

Irrigation

The interest in project-type irrigational development is low. Although the acreage of irrigated land in Franklin Parish has been increasing, it is still relatively small. The following Census of Agriculture data exemplifies this situation:

Item	Unit	Years 1959	1964	1969
Irrigated Land in Farms	acres	1,253	4,250	7,134
Number of Farms	number	38	86	99
Average per Farm	acres	33	49	72

The 7,134 acres irrigated in 1969 represent about 3 percent of the total cropland in Franklin Parish.

The only crop which requires regular irrigation is rice, whose main source of water is a shallow, manmade reservoir of about 200 acres. The other crop irrigated is cotton. The major source of this water is wells. Cotton is irrigated on an irregular basis since its water requirements are not high. Irrigation of cotton has been accepted slowly although experiments conducted in the parish at the Macon Ridge Branch Experiment Station indicate that it is profitable.

An average of about 2.5 inches of rainfall per month occurs during the droughty months. The time that this rainfall will occur is uncertain This uncertainty is best exemplified by excerpts from an experiment station bulletin which gives results of an experiment conducted from 1958 to 1962 as follows:

> Data for 1959 - "Although irrigation did increase yields by 305 pounds of seed cotton per acre, the difference was not significant. .....2 inches of irrigation water was applied to the designated plots on July 9. After application of the water, 0.8 inch of rain fell, possibly eliminating some benefits of the irrigation."1/

> Data for 1961 - "Ample rainfall in 1961 made it unnecessary to water plots that were to have been irrigated."2/

The cost of installing an irrigational system is a major investment many farmers are unwilling to make when they consider the irregularity of its use.

1/ Sherman A. Phillips, Cotton Irrigation Studies, Bulletin No. 579, (Baton Rouge: Louisiana State University and Agricultural and Mechanical College, Agriculture Experiment Station) 1964, pp. 8-9.

2/ Ibid., p. 13.

PROBLEMS

The primary source of ground water is from Quaternary Alluvial Deposits. Wells drawing water from this source have a potential for yields up to 6,500 gallons per minute. The water is suited for irrigation. A ridge of high chloride content water lying immediately west of the watershed may have influence in some wells along the western border. In Franklin Parish in 1969, 5.62 million gallons per day were pumped for irrigation from the alluvial aquifer. Irrigation development on individual farms is expected to expand in the future. Supplies of ground water are adequate in both quantity and quality. Water for future irrigation is expected to come mostly from ground sources.

Municipal and Industrial Water

Three towns in Franklin Parish obtain water from the valley alluvium of Pleistocene age. These are Gilbert (population 600), Winnsboro (population 4,250), and Wisner (population 1,300). Gilbert and Wisner are within the watershed. Pumpage from two wells in Gilbert averages approximately 35,000 gallons per day. Pumpage from two wells in Wisner averages approximately 96,000 gallons per day. The quality of the water from these wells is acceptable. The water at Gilbert contains 100 ppm chloride which is above the desirable level, but within the acceptable level of water quality for public consumption. This level of chloride is probably a result of the presence of a salt dome in the vicinity or the previously-mentioned saltwater ridge. There are no anticipated increases on the demand for water in these towns, and the present systems should be adequate.

Recreation

The 1970 population within a 30-mile radius of the center of the watershed was estimated to be 86,000. This area includes 17 villages and towns, only two of which are considered urban. Population projections[3/] to the year 1990 indicate a decrease in the number of people in a portion of the 30-mile radius area containing 85 percent of the present population. The main reason for this projected population decrease is the past and present migration of rural residents to urban areas.

The watershed is below average in facilities available for water-related recreational activities. Turkey Creek Lake, Lake Bruin, Lake St. Joseph, and Lake St. John, all within the 30-mile radius of the watershed, provide water-related recreational opportunities, but facilities are limited. Several streams and rivers are near the area. The best known ones are the Mississippi, Tensas, Ouachita, and Boeuf Rivers; Bayous Macon, Lafourche, and Vidal; and Big and Deer Creeks. The recreational potential of these waterways has not been developed fully.

3/ George C. Christon and Harris S. Segal, Population Projections to 1980 and 1990 for Louisiana and Its Parishes, Research Study No. 18, (New Orleans: Division of Business and Economic Research, College of Business Administration, University of New Orleans, 1973), pp. 21-22.

Public recreational areas within the 30-mile radius study area are Lake Bruin State Park (45 acres) and Russell Sage Wildlife Management Area (14,600 acres).

A sample of recreational needs based on the present population within the 30-mile radius includes 468 tent camping sites, 216 trailer sites, 518 picnic sites, 66 boat ramps, and 3 beaches and swimming areas of standard size.4/

There is a need for additional recreational facilities in the watershed, and local interest exists for developing these facilities. However, investigations indicate little opportunity for developing water-related recreational facilities because water storage sites are severely limited by the flatness of the terrain.

Fish and Wildlife

Changed land use has adversely affected fish and wildlife resources more than any other factors. In the past 15 years, 37,300 acres of bottom land hardwoods have been cleared. The majority of this acreage has gone into soybean production. The reduction in forested habitat resulted in losses of white-tailed deer, gray and fox squirrels, swamp rabbits, wild turkeys, and many nongame species.

The remaining 36,900 acres of forest land are of prime importance as wildlife habitat. The 10,000-acre block in the east-central portion of the project area has exceptionally high value because of its location, size, quality of habitat, and ownership pattern. As previously mentioned, clearing of bottom land hardwood has seriously depleted wildlife habitat, and unless this tract can be developed as a wildlife management area, it may eventually be cleared.

Although large acreages of open land habitat are available, use of the habitat is low because cover is inadequate. When the soybeans are harvested, many beans and weed seed are shattered and left for wildlife food. However, the remaining cover is so sparse that game species such as quail will not feed in these fields. Also, cover along fences and ditches is too sparse for quail or rabbits to use as travel lanes or headquarter areas. Game species using open land habitat are the bobwhite quail, mourning dove, and cottontail rabbit.

Public access to some of the forested areas is limited. Without four-wheel drive or all-terrain vehicles, the unimproved roads are impassable during wet periods. Legal posting of private land also limits public access.

4/ Louisiana State Parks and Recreation Commission, State of Louisiana, Comprehensive Outdoor Recreation Plan, 1970-75 (Baton Rouge: Louisiana State Parks and Recreation Commission, 1969), pp. 2.6-2.7.

PROBLEMS

The conversion of forest land to open land has increased sediment in aquatic ecosystems. Pesticides and nutrients (N, P, K,) are reaching downstream areas in greater quantities than when the acreage was forested. Eutrophication in Boeuf River, Tensas River, and Bayou Macon has accelerated as a result of the increased use of fertilizers.

Turbid water is another problem limiting the fisheries in ponded water channels, intermittent channels, and the three outlets. This problem is a result of the erosion of fine-textured soils on intensively-farmed drainage areas.

Use of chlorinated hydrocarbons as pesticides is a problem. Chlorinated hydrocarbons persist in aquatic ecosystems for long periods of time. Epps, *et al.*,[5/] reported channel catfish taken from the Tensas River near Clayton (12 miles south of the project) containing 6.28 ppm of DDT and metabolites. Toxaphene levels in channel catfish were reported to be 5.05 ppm.

Economic and Social

The level of income necessary for surviving on a minimum diet with none of the amenities of prosperity has been determined by the Social Security Administration.[6/] By their definition, an individual is considered poor if his personal income or the income of the family to which he belongs inadequately provides for his subsistence. In 1960, 58 percent of all the families in Franklin Parish were classified as poor. In 1966, 44 percent were classified as poor. This represents an improvement of approximately 13 percent in 6 years. However, 96 percent of all the counties in the United States had a smaller portion of poor families. About 0.7 percent of the families in the State of Louisiana live in Franklin Parish. However, 0.9 percent of all the poor families in the State reside in this parish. Therefore, it has a greater than proportionate share of poor families. In 1969, the buying income of households in the parish was 38 percent below the average for the State.

According to the 1970 census for Franklin Parish, there were 5,684 families with a median income of $4,171. Of the total families, 1,277 were urban with a median income of $5,840, 2,753 were rural nonfarm with a median income of $4,204, and 1,654 were rural farm with a median income of $3,286. Only 29 percent of the urban families had incomes less than the

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5/ E. A. Epps, *et al.*, "Preliminary Report on a Pesticide Monitoring Study in Louisiana," *Bulletin of Environmental Contamination and Toxicology*, Volume 2, No. 6 (New York: Springer Verlog, Inc., 1967) pp. 333-339.

6/ James R. Robo and Dean R. Dudley, *Statistical Abstract of Louisiana*, 4th ed. (New Orleans: Division of Business and Economic Research, College of Business Administration, Louisiana State University in New Orleans, 1971), p. 172.

poverty level while approximately 45 percent of both the rural nonfarm and rural farm had incomes less than the poverty level. Since the watershed population is all rural, about 45 percent of families residing in it are below the poverty level.

Estimates based on the 1969 Census of Agriculture indicate 32 percent of the 820 farms in the watershed were below 50 acres, and 22 percent were between 50 and 100 acres. This indicates over 50 percent of the farms were below 100 acres in size. Thirty-nine percent of the farms had sales less than $2,500, 24 percent had sales between $2,500 and $5,000, and 16 percent had sales between $5,000 and $10,000. On an average, farmers have received $.24 net return for each dollar of gross sales.7/ For example, a farm with gross sales of $2,500 would have a net income of $600. Some farmers are able to augment their low farm income by finding employment off the farm.

About 10 percent of the farms use 1½ man-years or more of hired labor. These farms are scattered throughout the watershed and are not confined to problem or nonproblem areas.

Old-age assistance and aid to dependent children are the two largest categories of welfare aid granted to recipients in Franklin Parish. Of the total welfare assistance grants made in fiscal year 1969, 63 percent was for old-age assistance, 25 percent was for aid to dependent children, 9 percent was for disability assistance, 2 percent was for general assistance, and 1 percent was for aid to the needy blind.8/

In 1970, 43 percent of the parish population was 18 years old or younger and 11 percent was 65 years old or older. Approximately 2,050 children, representing 20 percent of the population 18 years or younger, received aid.9/

The population of Franklin Parish decreased by 2,142 from 1960 to 1970. This was an 18.7-percent decrease in the expected 1970 population. The expected 1970 population was calculated by adding births from 1960 to 1970 to the 1960 population and then subtracting deaths which occurred during that same time period. The net out-migration totaled 5,520. Of the net out-migration, 77 percent were nonwhite and 23 percent were white.10/

7/ "Farm Suppliers, Mighty Link in the Marketing Chain," Farm Index (February 1974) p. 10.

8/ Robo, op. cit., p. 79.

9/ Ibid., p. 87.

10/ Fred M. Wrighton and Barbara H. Denton, "Net Migration in Louisiana," The Louisiana Economy (Ruston: College of Business Administration, Division of Business and Economic Research, Louisiana Tech University, 1971), Vol. V, No. 1, pp. 2-5.

PROBLEMS

Many young adults are leaving the rural areas to seek employment elsewhere. From 1960 to 1970, the number of rural males 20 to 45 years of age decreased 6.5 percent, and the number of rural males 55 years and older increased 13 percent.11/

Franklin Parish and Richland Parish are eligible for financial assistance under Title IV of the Public Works and Economic Development Act. Franklin Parish and Richland Parish have had unemployment at 6 percent or more of the work force.

11/ Data to develop these statistics were obtained from the 1960 and 1970 Census of Population, Final Report PC(1) - A20 Louisiana.

PROJECTS OF OTHER AGENCIES

This watershed is in the Boeuf and Tensas Rivers and Bayou Macon Project subunit of the Mississippi River and Tributaries Project Basin Study Area of the U.S. Corps of Engineers. Channel work was completed by the Corps of Engineers on Bayou Macon and Boeuf River under the Flood Control Act of 22 December 1944 as amended by subsequent Flood Control Acts, and additional work is now authorized and underway under authority of the amended Flood Control Act of 1965. These channels provide outlets for the watershed.

The Department of Public Works (DPW) has continued over the years to work with local parish organizations to expand and renovate certain channels within the watershed. In the past years, the DPW, cooperating with The Franklin Parish Police Jury has installed a partial system of channels. Included in this system was a channel to divert approximately 45 percent of the drainage area of Deer Creek into Bayou Macon with the remaining 55 percent draining into its natural outlet, Boeuf River. Because of subsequent changes in land use and normal deterioration of the channels, many of these are no longer adequate to provide the needed protection.

PROJECT FORMULATION

Introduction

On April 5, 1966, the Franklin Parish Police Jury formed the Franklin Parish Watershed Commission and named 11 commissioners to serve as a committee for the police jury in formulating a watershed work plan. In September 1966, an application for the East Franklin Watershed was signed by the Sponsoring Organization and was submitted to the State Soil and Water Conservation Committee. The State Committee approved the application in October 1966. The authority to begin planning under Public Law 566 was granted on February 12, 1968. In 1969, the application was amended to include portions of Richland and Catahoula Parishes.

Organizations endorsing this application were the town of Winnsboro, the town of Gilbert, the town of Wisner, the Winnsboro Chamber of Commerce, and the Franklin Parish Farm Bureau, Inc.

A work outline was prepared to guide the development of a watershed work plan. The work outline identifies the responsibilities of the Sponsors and each discipline of the Soil Conservation Service, with assistance provided by the U.S. Fish and Wildlife Service, the Louisiana Wild Life and Fisheries Commission, the U.S. Forest Service, the Louisiana Forestry Commission, and the Louisiana Department of Public Works.

A meeting was held on April 16, 1968 with the Sponsors, the Louisiana Department of Public Works, and the Soil Conservation Service to coordinate planning efforts. The discussions included the design criteria to be used, the location of work for different contracts, measures to be included to reduce adverse impacts to fish and wildlife resources, and cost estimates.

In accordance with the work outline, the structural measures proposed in an earlier draft of the work plan was reviewed by the Louisiana Wild Life and Fisheries Commission. This review indicated that substantial adverse effects would occur. Extensive additional field reviews were conducted jointly with the Louisiana Wild Life and Fisheries Commission, the U.S. Fish and Wildlife Service, and the Soil Conservation Service biologists in an effort to identify the adverse effects. Upon completion of these exhaustive studies, a summary of the areas where adverse effects may occur was developed together with recommendations for measures to minimize these adverse effects.

Identifiable adverse effects jointly developed by the three agencies were reviewed with the Sponsors. Recommendations for

eliminating and minimizing many of these effects were developed and agreed upon by the Sponsors. These recommendations are enumerated in the Alternatives and constitute the basis for formulating the selected plan.

Three public information meetings were held (August 6, 1968; October 10, 1968; and March 29, 1974) by the Sponsors in various locations during the project formulation phase. The purpose of these meetings was to receive opinions and ideas from individuals, groups, agencies, and organizations on alternatives that should be investigated to meet the project objectives. Publicity was provided for these meetings through the Franklin Sun (with a circulation of 4,200), the Franklin Parish Farm Bureau News (with a circulation of 2,425), the Northeast Soil and Water Conservation District Newsletter (with a circulation of 2,489), and the local radio station. A notice of the public meeting held in March 1974 appeared in the Franklin Sun, the Monroe News-Star, the Monroe Morning World, the States Item (Baton Rouge), the Morning Advocate (Baton Rouge), the Shreveport Times, the New Orleans Item, and the Times Picayune (New Orleans). Radio and television coverage was given by radio station KMAR in Winnsboro and television station KNOE in Monroe. Notices of this meeting were mailed to individuals, interested groups, organizations, and other agencies together with notices to the agencies involved in the planning process.

Other measures were taken in preparation of the project. In a meeting in June 1972, the Forest Service and the Soil Conservation Service prepared a schedule of needs for forestry contributions to the watershed work plan. Twenty-two meetings were held by the Franklin Parish Watershed Commission to make decisions necessary for plan formulation and to keep all agencies involved in the planning process informed on the progress of the plan. The Louisiana Historical Preservation and Cultural Commission and the Curator of Anthropology of Louisiana State University were contacted to obtain the locations of places of historical and archaeological importances.

Objectives

In order to obtain viewpoints from a different source on environmental concerns, professional services were obtained from Coastal Environmental, Inc. Employees of this corporation have either M.S. or Ph.D. degrees in geography (flood plain management), zoology, marine science, chemistry, geology, and geo-chemistry. Their primary expertise is environmental evaluation and environmental impact statement preparation. A team representing interests in geography, biology, geology, and zoology reviewed the work plan and environmental impact statement and made suggestions for improvement.

FORMULATION

Copies of the preliminary draft work plan and environmental impact statement were mailed to local, State, and Federal agencies and concerned groups for the informal field review. A public meeting was held on October 21, 1974 to present informal field review comments and the responses or changes resulting from these comments. Persons in the audience were given an opportunity to question and comment on the material presented.

The cropland and pastureland are farmed and used intensively. The landowners and operators, through their application and interest displayed at public meetings, have indicated a strong desire to improve the economic condition of the watershed by maximum management of resources. They requested a project be formulated that would allow optimum development of soil and water resources available.

The needs for recreational, irrigational, municipal, and industrial water were discussed with the Sponsors. Although demands are expected to increase, these needs were not included as project objectives. Irrigation, municipal, and industrial water needs can be met from ground water sources. Potential sites for surface water areas for recreational development are not available.

Problems discussed under WATERSHED PROBLEMS section are of deep concern to the residents. The Sponsoring Local Organization and the Service agreed to the following objectives:

1. Improve farming conditions to increase farm family incomes and to improve living conditions.

2. Reduce average annual soil loss on cropland to the minimum consistent with sound conservation farming methods.

3. Provide agricultural land a level of flood protection and drainage which will assure economic returns to farms.

4. Facilitate achieving the preceding objectives by providing acceleration of the current land treatment program so that about 54 percent of the agricultural land will be adequately treated by the end of the project installation period.

5. Install project measures in a manner which will be least damaging to fish and wildlife habitat.

Environmental Considerations

Effects of structural measures on fish and wildlife habitat were given careful consideration. In order to preserve wildlife habitat, for

example, project channels were designed to allow more flooding and slower runoff in forest land than in open land. This design feature will tend to encourage landowners to allow forest land to remain forested.

Valuable wildlife and fish habitat along or in channels requiring excavation will be partially or totally preserved by working from one side. The side on which habitat will be preserved was considered in planning and will be determined at the time of construction by a Soil Conservation Service biologist in consultation with the Louisiana Wild Life and Fisheries Commission and the U.S. Fish and Wildlife Service.

Erosion and sediment in channels were also important considerations. Several measures are to be used in project formulation to reduce adverse effects. Where main channels join laterals of near equal depth, short sections of the main channels downstream from the junctions will be deepened to intercept sediment. Where the depth of the main channels is more than the laterals, recessed inlets in the mouths of the laterals will be utilized for this purpose. Vegetation on berms, spoil, and channel side slopes will be reestablished following construction. Structures for water control (weirs) will be installed to trap sediment and create 46 miles of ponded water in project channels. Some of these structures will reduce soil erosion at specific points. Land treatment measures will provide the most significant reduction in sediment and, subsequently, improve water quality.

The Sponsors recognized the need to study the effects of the proposed project measures on downstream environmental values. Channel work usually causes increases in peak stages immediately downstream. However, the effect diminishes as distance downstream from the channel work increases.

Three systems of structural measures were investigated; each provided a different level of protection to agriculture with subsequent proportional effects on fish and wildlife resources. The results of these studies were used as a basis for selecting a system that would provide the best balance of agricultural benefits and environmental quality. The system which would provide a 4-year level of protection was found to be the most consistent with the Sponsors' objectives.

The features adopted to minimize adverse impacts on fish and wildlife habitat are:

1. Minimize excavation in forest land habitat.

2. Accomplish excavation in forest land from the side of the channel with the poorest quality of habitat.

3. Excavate from only one side of the channel to preserve the bank cover on the opposite side, thus alleviating high summer temperatures.

4. Eliminate excavation as much as possible in channels with intermittent flow.

5. Eliminate work on channels as much as possible upstream from their outlets.

6. Seed disturbed areas with plants beneficial to wildlife species.

7. Install structures for water control (weirs) to minimize effects on fisheries.

8. Install land treatment measures.

Alternatives

Because the topography upstream from the problem area is flat, sites for water impoundment are not available; therefore, floodwater retarding structures are not considered an alternate. The alternatives considered are given in the following discussion.

Land Treatment Only - The major land treatment measures that could be installed are conservation cropping systems, crop residue management, drainage land grading, irrigation land leveling, drainage mains and laterals, structures for water control, pasture and hayland management, forest management, pasture and hayland planting, wildlife wetland habitat management, and wildlife upland habitat management. These measures could be installed to adequately treat about 20,000 acres of cropland and pastureland that have little or no damages from flooding and inadequate drainage. In addition, land treatment measures could be installed on some marginal land; however, the effectiveness would be limited because of floodwater and drainage problems. The installation cost would be about $880,000.

Land treatment measures to reduce wetness are impractical. Most bottom land soils are fine textured throughout and some of the loessial terrace soils have a restrictive layer below the surface. These conditions restrict the downward movement of water in these soils. Land treatment measures such as drainage field ditches and land smoothing or grading are needed to remove water at or near the surface. Some of these measures are presently being applied for this purpose. However, the outlets for on-farm drainage systems are inadequate. For these reasons, land treatment alone would not provide project benefits.

FORMULATION

Levee and Pump System and Land Treatment - The flat topography lends itself to establishing levees and installing pumping plants around individual farms or hydrologic units. An internal drainage system within each enclosed unit is required to remove the water from within the leveed areas. The cost of installing the levee and drainage system is $23,000,000 and the annual operation and maintenance cost is $400,000.

The land treatment program would include conservation measures to treat 92,100 acres at a cost of $3,983,000. The conservation measures would include but not be limited to conservation cropping systems, crop residue management, land smoothing, drainage field ditches, pasture and hayland management, pasture and hayland planting, wildlife wetland habitat management, and wildlife upland habitat management. These measures would be installed singly or in combinations as needed.

This alternative would provide a high degree of protection from flood and drainage problems. Larger channels would be required and approximately 6,813 acres of land would be permanently committed to levees.

Change Land Use to Enterprises that will Tolerate Wet Soil Conditions - Nonstructural alternative uses of the land include forest land, wildlife wetland development, and fish farming.

The Nation's demand for timber products is certain to increase in the future. If present trends of management continue, the demands for forest products will exceed the supply.

Southern hardwoods can thrive in the poorly-drained areas of the watershed and can be planted at a cost of $50 per acre. The first intermediate cutting can be made in about 25 years. Under current management levels, average annual returns from land in hardwood timber is about $4 per acre for forest products1/ and $0.25 to $3 per acre for wildlife leases.2/

Under this alternative, it is estimated 58,000 acres of land could be converted back to bottom land hardwoods at an average annual cost of $1.23 per acre. Likewise, full level annual returns were estimated at $1.95 per acre.

1/ U.S. Department of Agriculture, Soil Conservation Service, Technical Guide, Franklin Parish, Section V.

2/ Richard K. Yancey, The Vanishing Delta Hardwoods and Their Wildlife Resources (Baton Rouge: Louisiana Wild Life and Fisheries Commission, 1969), p. 7.

Under present drainage conditions with this alternative, approximately 5,000 acres of wildlife wetland areas could be developed to provide food and water for waterfowl, furbearers, crawfish, and other wildlife. Development for these purposes would require construction of levees, development of water supplies, and installation of pumps and water control structures.

Average annual establishment costs for this purpose are estimated to be $100 per acre. Average annual monetary benefits would be approximately $25 per acre.

Fish farming has been introduced into the area and a potential exists under present drainage conditions for additional development.

The initial capital outlay for developing a fish farming operation is approximately $380 per acre.3/ The risks in producing a harvestable crop are high and market opportunities for small operators are limited. Annual returns from this enterprise average $160 per acre4/. It is estimated fish farming would increase approximately 20 percent and provide an estimated $4,000 of additional average annual net benefits.

Most of this change in land use would occur on poorly-drained soils in the watershed. It is estimated a total of 63,000 acres of cropland would be shifted to the 58,000 acres of forest land and 5,000 acres to the wildlife wetland habitat.

The average annual benefits of $21,300 accruing to wildlife wetland development would not accrue in total directly to landowners. It would be distributed among the various sectors of the local economy for food, lodging, supplies, fuel, etc. The accrual of these benefits would also be dependent on hunting pressure and the population of the waterfowl occupying these areas. This shift in cropland would result in an estimated average annual loss of $581,000 of net returns based on present conditions. The total average annual costs of this alternative are estimated to be $658,300 and total average annual benefits would be approximately $334,200. The total average annual net benefits foregone by this alternative in lieu of a combination of channel work and land treatment would be $1,202,000.

3/ James T. Davis and Janice S. Hughes, Channel Catfish Farming in Louisiana (Baton Rouge: Louisiana Wildlife and Fisheries Commission) p. 28.

4/ Ibid.

Channel Work and Land Treatment - Various sizes and lengths of channels were studied to determine whether the 1.5-year, the 4-year, or the 7-year level of protection would be the most desirable. The effects of each of these levels of protection were evaluated without-project and with-project conditions. The drainage area served by the principal channels and associated laterals was divided into four evaluation units. The area served by Channels M-1, M-2, and associated laterals is Evaluation Unit I. The area served by Channel M-3 and laterals is Evaluation Unit II. Evaluation Unit III is the area served by Channels M-4, M-4A, M-6, M-7, M-8, M-9, M-10, M-11, M-12, and all associated laterals. Evaluation Unit IV is the area served by Channels M-13, M-14, M-16, M-17, M-18, M-20, M-21, M-22, and all associated laterals. Boundaries of evaluation units are shown on Figure 7, Project Map.

The land treatment measures to be installed for this alternative would include but not be limited to conservation cropping systems, crop residue management, land smoothing, drainage field ditches, pasture and hayland management, pasture and hayland planting, wildlife wetland habitat management, and wildlife upland habitat management. These measures would be installed singly or in combinations as needed. The 4- and 7-year level of protection would provide the same benefits previously described. However, the outlet limitation of the 1.5-year level would reduce the effectiveness of the land treatment program and the amount of land that could be adequately treated.

Providing a 1.5-Year Level of Protection - This would require 169 miles of channel work, with 1,615,000 cubic yards of excavation. The total structural measures cost would be $3,086,900. The annual cost, including operation and maintenance, would be $301,500; the damage reduction would be 45 percent.

Land used for channels would change in the following manner:

1. Land within channels would increase from 923 to 949 acres.

2. Land used for berms would increase from 112 to 491 acres.

3. Land used for spoil would increase from 204 to 619 acres.

Land used for channels and berms would increase because increased channel widths require wider berms. Land occupied by spoil in forest land and wooded channel bank areas would increase because existing and project-created spoil would not be spread.

Types of wildlife habitat were categorized according to examples shown in the Wildlife Resources section. Channels located on

cropland or pastureland which had no trees or brush on the berms and spoil were categorized as "open land" channels. Channels located in cropland or pastureland having narrow strips of trees or brush on the berms and spoil were categorized as "wooded channel bank." Channels located in forests were categorized as "forest." Land used for channels, berms, and spoil within these three categories would change in the following manner:

1. Open land acres occupied would increase from 306 to 633 acres.

2. Wooded channel bank acres occupied would change from 597 to 885 acres (part of this total would be converted to open land).

3. Forest land acres occupied would change from 336 to 541 acres (part of this total would be converted to open land).

The increase in wooded channel bank acreage occupied would be a change in wildlife habitat because the channel and berm would be kept free of woody vegetation under the maintenance program. Open land permanently occupied includes only the channel and berm. The spoil is to be spread and is not considered a loss of resource. Spoil disturbed in the wooded channel banks and in forest land would be allowed to grow back into trees by natural plant succession. Of the 2,059 acres required for project channels, 123 acres would require clearing only, 1,572 acres would require excavation, and 364 acres would be in adequate channels.

The land treatment program under this level of protection would include conservation measures to adequately treat 41,000 acres of cropland, pastureland, and other land. In addition, 20,000 acres of cropland and pastureland will have some land treatment measures installed. The cost would be about $1,763,000. The measures to be installed include those discussed under Floodproofing and Land Treatment.

Providing a 4-Year Level of Protection - This would require 186 miles of channel work with 2,212,700 cubic yards of excavation. The total structural measures cost would be $4,045,000. The annual cost, including operation and maintenance, would be $359,100; the damage reduction would be 78 percent.

Land used for channels would change in the following manner:

1. Land within channels would increase from 923 to 1,066 acres.

2. Land used for berms would increase from 112 to 517 acres.

3. Land used for spoil would increase from 204 to 696 acres.

Land used for channels, berms, and spoil within these three categories would change in the following manner:

1. Open land acres occupied would increase from 306 to 699 acres.

2. Wooded channel bank acres occupied would change from 597 to 980 acres (part of this total would be converted to open land).

3. Forest land acres occupied would change from 336 to 600 acres (part of this total would be converted to open land).

The increase in wooded channel bank acreage occupied would be a change in wildlife habitat because the channel and berm would contain only scattered trees under the maintenance program. Of the 2,279 acres required for channels, 135 acres require clearing only, 1,728 acres require excavation, and 416 acres would be in adequate channels.

The land treatment program under this level of protection would include conservation measures to treat adequately 92,100 acres of cropland, pastureland, and other land. In addition, 44,400 acres of cropland and pastureland will have some land treatment measures installed. The cost would be about $3,938,000. The measures to be installed include the same as discussed under Floodproofing and Land Treatment.

Providing a 7-Year Level of Protection - This would require 192 miles of channel work with 2,567,000 cubic yards of excavation. The total structural measures cost would be $4,577,100. The annual cost, including operation and maintenance, would be $421,300. The damage reduction would be 88.4 percent.

Land used for channels would change in the following manner:

1. Land within channels would increase from 923 to 1,141 acres.

2. Land used for berms would increase from 112 to 532 acres.

3. Land used for spoil would increase from 204 to 738 acres.

Land used for channel, berms, and spoil within the three categories - open land, wooded channel bank, and forests - would

change in the following manner:

1. Open land acres occupied would change from 306 to 738 acres.

2. Wooded channel bank acres occupied would change from 597 to 1,038 acres (part of this total would be converted to open land).

3. Forest acres occupied would change from 336 to 635 acres (part of this total would be converted to open land).

The increase in wooded channel bank acreage occupied would be a change in wildlife habitat because the channel and berm would be kept free of woody vegetation under the maintenance program. Of the 2,410 acres required for channel work, 143 acres would require clearing only, 1,832 acres would require excavation, and 435 acres would be in adequate channels.

The land treatment program would include conservation measures to adequately treat 92,100 acres of cropland, pastureland, and other land. In addition, 44,400 acres of cropland and pastureland will have some land treatment measures installed. The cost would be $3,938,000. The measures to be installed include the same features discussed under Floodproofing and Land Treatment alternative.

Varying Degrees and Locations of Channel Work - Varying degrees and locations of channel work were investigated with assistance from the Louisiana Wild Life and Fisheries Commission and the U.S. Fish and Wildlife Service. Specific channels investigated were M-16, L-16A, M-5, M-12, L-12A, M-20, L-1B, M-21, M-9, L-9A, M-19, L-19A, L-19B, M-1, L-1A, L-1C1, L-1F, L-1F1, M-2, L-2A, L-2B, L-2C, L-2G, M-3, M-4, M-4A, and M-17. These channels were studied with specific emphasis on fish and wildlife resources. The alternatives studied for each of these channels are listed by channels as follows:

1. M-16 and L-16A - Two layouts were proposed for this system. The first proposal was to start M-16 at Big Roaring Bayou about 0.5 mile above Louisiana Highway 4, follow a northwesterly direction in a slough, then due west about 14,500 feet. Begin L-16A in the large bend in Big Roaring Bayou about 0.5 mile north of Louisiana Highway 4 and follow a slough in a northwesterly direction, ending approximately 3.5 miles from the outlet. The second layout proposed was to start M-16 in Long Bayou approximately 0.5 mile south of Louisiana Highway 4, then enter a slough that courses in a westerly direction approximately 6,000 feet, then northwest approximately 7,500 feet, then in a meandering westerly direction approximately 7,500 feet. L-16A leaves M-16 approximately 3,000 feet from the upper end and extends 1 mile due north. The first layout would result in adverse effects to 30 acres of Type 1

wetlands. The second outlet was selected to prevent disruption of 4 miles of previously-unmodified, natural channels in bottom land hardwood forest. In the second layout, only 1.5 miles of previously-modified channels through bottom land hardwood forest will be affected. Consequently, the acreage of forest land required for channel rights-of-way would be reduced for layout number two.

2. M-5 - One proposal was made to route a channel through a brake approximately 1 mile upstream from Channel M-4 to intercept water from the Macon Ridge. This would prevent inundation of open land east of the brake. This channel route would drain 110 acres of Type 7 wetlands.

3. M-12 and L-12A - Biologists recommended that excavation be limited as much as possible to eliminate temporary increases in turbidity in Bayou Macon "cutoff No. 3." It was determined that the lower 2.8 miles (15,000 feet) of channel could be left in its present condition, with excavation being limited to the upper 1.6 miles (8,364 feet). A study will be made of L-12A during the operations stage to determine to what extent excavation can be eliminated on the lower end.

   The lower ends of these channels left in the present condition will provide filtering media for runoff entering into "cutoff No. 3."

4. M-20 - Two routes were studied to locate the lower end of M-20. The first route begins in Tensas River approximately 8,500 feet downstream from M-18 in a slough extending in a west-northwesterly direction approximately 3,500 feet, then in a westerly meandering direction approximately 5,000 feet, then in a southwesterly direction to the confluence with a brake approximately 2 miles east of Lake Dean. The second route begins approximately 6,500 feet farther south at a bend of the Tensas River in a slough and extends approximately 2,000 feet in a southwesterly direction, then in a northerly direction for approximately 5,000 feet and intersects the route described above. Both outlets are adequate. The second route is presently in a stable condition, and a grade stabilization structure is not required to empty into Tensas River. It also provides approximately 6,200 feet more undisturbed area. This would filter out more sediment from the runoff prior to reaching the Tensas River.

5. L-1B - One proposal was to extend the channel through a block of forest land to more effectively serve the area sloping away from Bayou Macon. This would include 800 feet of construction of channel through the forest land. A second proposal was to end the ditch in a low area prior to entering the forest land. The second proposal would eliminate construction through 800 feet of forest land and preserve

approximately 1.1 acres of channel rights-of-way through bottom land hardwoods. This would reduce the probability of clearing the block of forest land. Drainage and flood protection can be obtained by diverting runoff to another route.

6. M-21 (Dean's Bayou) - Varying limits of channel work were studied. The proposal adopted would reduce excavation and clear the trees and debris necessary to allow passage of required flow. This proposal would also eliminate the possibility of lowering the water level in Lake Dean.

7. M-9 and L-9A - Hurricane Bayou, designated M-9, begins near the Louisiana Highway 577 crossing in Bayou Macon "cutoff No. 2." Martin Slough, designated L-9A, begins at M-9 approximately 24,000 feet upstream. One proposal was to excavate all of M-9 on the west side of Louisiana Highway 17 up to the gravel road extending west from Louisiana Highway 17 about 2.5 miles north of Bakers and excavate all of L-9A. The second proposal was to excavate M-9 on the west side of Louisiana Highway 17 approximately 630 feet upstream (station 95+00 to station 158+25), and from 1 mile north of Lamar to the gravel road extending west from Louisiana Highway 17, about 0.5 mile north of Bakers (station 334+50 to station 435+40), and clear only to the blacktop road extending west from Louisiana Highway 17, 1.5 miles north of Bakers with no work on the upper 6,600 feet. In this proposal, the possibility of diverting L-9A into M-9 approximately 1 mile north of Lamar will be determined during the operations stage. Five structures of water control (weirs) will be installed in M-9. The second proposal requires a reduced amount of excavation and would produce less sediment and turbidity during the construction period. The weirs will trap about 1 percent of the sediment produced by sheet erosion and about 30 percent of the sediment produced during the construction period (estimated 1,640 tons). This proposal would leave the 5,700 feet of unmodified natural channel on the upper end in its natural condition.

8. Channel System Above Lake Dean (M-19, L-19A, and L-19B) - The first alternative would require channel work on the existing system draining into the lake, then improving the outlet via Dean's Bayou. This alternative would increase the rate of eutrophication of Lake Dean. Other routes were investigated in an effort to divert flow from farmland above Lake Dean. One approach would require a dam on the upper end of Lake Dean and a diversion channel cut through a ridge to outlet into M-20. This would require construction in unstable soil conditions and would cause deterioration of Wiley's Brake. A second approach would require a diversion channel paralleling Lake Dean with spoil being placed on the lake side to prevent

flow from entering the lake. The cost of this approach would exceed the cost of works above the lake. Eliminating the entire system because of the possibility of extensive damage to aquatic and terrestial ecosystems within the area of the drainage system was also investigated.

9. Other channels investigated to eliminate excavation on the lower ends are M-1, L-1A, L-1C1, L-1F, L-1F1, M-2, L-2A, L-2B, L-2C, L-2G, M-3, M-4, M-4A, and M-17.

Levees and Floodgates to Protect Against Backwater Flooding from Tensas River - Construction of levees and floodgates were studied as a solution to prevent backwater flooding. A study of gage records was made to determine the frequency of backwater flooding. There is a 30 percent chance that backwater flooding will occur on an annual basis and a 10 percent chance during the soybean growing season. This backwater flooding occurs primarily in the area of the Sharkey-Tensas Soil Association; it causes no damages to residences and only minor damage to crops. The cost for installing a levee and floodgate system to protect against backwater flooding from Tensas River is $3,500,000. The annual operation and maintenance cost would be $100,000.

No Project - The "No Project" alternative would include the current land treatment program. At present, 7 percent of the cropland and pastureland has received adequate land treatment. Land adequately treated is defined as land used within its capabilities on which the proper conservation practices have bean applied to compensate for its limitations. The tabulated data on the following page summarizes the land treatment measures applied to date and costs. With "No Project," the current rate of installation of land treatment measures will remain about the same.

Water problem areas will continue to exist with this alternative. Sponsors do not have sufficient funds to finance the installation of a complete channel system. Only limited work on certain channels would be done. No orderly, planned procedure would be followed. Installation of appurtenant measures needed to control erosion and sediment would not be installed. This haphazard approach would result in damages to the vegetative communities and aquatic ecosystems that would not be mitigated. The pursuit of this alternative would result in little emphasis being placed on environmental values. If the project is not installed, net annual benefits of about $884,800 will be foregone.

Reason for Selecting Works of Improvement

The alternative of channel work with land treatment measures was considered to most nearly meet environmental and economic objectives. Within this alternative, it was determined that channel work providing

STATUS OF LAND TREATMENT MEASURES

East Franklin Watershed, Louisiana

	Unit	Applied To Date	Total Cost 1/ (Dollars)
Land Treatment			
Chiseling & Subsoiling	Ac.	6,600	34,200
Conservation Cropping System	Ac.	12,600	49,000
Contour Farming	Ac.	200	800
Crop Residue Management	Ac.	24,700	64,000
Drainage Field Ditches	Ft.	422,500	54,800
Drainage Land Grading	Ac.	4,100	462,200
Drainage Mains & Laterals	Ft.	383,600	74,500
Grade Stabilization Structures	No.	4	2,100
Irrigation Field Ditches	Ft.	54,600	21,900
Irrigation Land Leveling	Ac.	100	11,300
Irrigation System	No.	24	108,900
Land Smoothing	Ac.	300	3,900
Pasture & Hayland Management	Ac.	3,700	19,200
Pasture & Hayland Planting	Ac.	10,100	392,700
Structures For Water Control	No.	200	38,900
Improvement Cut	Ac.	10,700	13,900
Cooperative Forest Fire Control	Ac.	36,900	28,700
TOTAL			1,381,000

1/ Price base 1974.

May 1974

a 4-year level of protection in combination with land treatment measures would provide the most desirable balance between economic and environmental considerations.

Structural measures providing this level of protection with associated land treatment measures will also enable optimum development of land and water resources in the watershed and improve economic conditions. At the same time, overall environmental quality will be protected and ultimately improved.

The level of protection afforded by the proposed system will provide the most benefits in relation to the cost and will meet project objectives. Damages and losses will be reduced about 75 percent.

The land treatment measures included in the proposed plan are those measures necessary to achieve the project objectives including the reduction of soil loss on cropland, meet the desired level of adequate land treatment for the watershed, and improve farm income.

With a 1.5-year level of protection, damages and losses would be reduced 45 percent, or 30 percent less than with the 4-year level, while corresponding costs would be only 18 percent less. This would result in costs exceeding benefits.

A 7-year level of protection would afford only a 10 percent greater reduction of damages and losses than a 4-year level. The corresponding increase in average annual costs would be 11 percent greater, and an additional 6 percent more land would need to be cleared for the channel work.

The 4-year level of protection requires 186 miles of channel work; 7 miles more than the 1.5-year level of protection and 6 miles less than the 7-year level of protection. It requires about 2,213,000 cubic yards of excavation, 598,000 (27 percent) more than the 1.5-year level of protection and 354,000 (16 percent) less than the 7-year level of protection. The 4-year level of protection requires 135 acres of channel clearing only in addition to the clearing required for excavation. This is 12 acres (9 percent) more than the 1.5-year level and 8 acres (6 percent) less than the 7-year level.

Sediment and turbidity produced during construction by the three levels of protection would not be significantly different. Even though the cross-sectional area changes with a corresponding level of protection provided, it is accomplished with a small change in exposed channel perimeter. For example, at one design point, the cross-sections necessary to provide the 1.5-, 4-, and 7-year levels of protection studied would result in wetted perimeters of 23, 23, and 24 feet, respectively.

The following tabulation furnishes data to compare the effects of three different levels of protection on land area occupied by channel rights-of-way before and after project construction:

Land Area	Existing	Level of Protection 1.5-Year	4-Year	7-Year
Channel	923	949	1,066	1,141
Berm	112	491	517	532
Spoil	204	619	696	738
TOTAL	1,239	2,059	2,279	2,411
Open Land	306	633	699	738
Wooded Channel Banks	597	885	980	1,038
Forest Land	336	541	600	635
TOTAL	1,239	2,059	2,279	2,411

A 4-year level of protection would require a lesser acreage of wildlife habitat altered than a 7-year level. Standing crops of fish would be increased about 1 percent with the project. This would also apply to either one of the other two levels of protection considered.

Changes in wildlife habitat and the effects of these changes for the three levels of protection studied are shown in the tabulation on the following page. Preproject and postproject standing fish crops are also listed.

With the lower level of protection (1.5 years), there would be insufficient outlets for drainage. Therefore, the extent of land treatment would be reduced consistent with the limited capacity of the outlets. The benefits would, in turn, be severely limited compared to the amount of benefits that could be realized with a 4-year level of protection with only an 18-percent increase in the average annual cost of structural measures.

With the corresponding reduced land treatment at the 1.5-year level, erosion and sediment, water quality, and aesthetic values would not be appreciably different from existing conditions. At this level, less than 50 percent of the loss of farm income would be recoverable. This would not sufficiently meet the intentions of the project objectives of improved farm income.

With a 7-year level of protection, land treatment would be installed at about the same rate as with the 4-year level of protection. If outlets of greater capacity were installed as would be

CHANGES IN HABITAT ACRES AND POPULATIONS OF WILDLIFE SPECIES
FOR THE THREE LEVELS OF PROTECTION
East Franklin Watershed

Species	Animal Acre Ratio	Pre-Project		Changes by Alternatives					
				1.5-year Level of Protection		4-year Level of Protection		7-year Level of Protection	
		Acres	Total Animals	Acres	Animals	Acres	Animals	Acres	Animals
Deer	1:20	36,900	1,845	- 213	- 11	- 277	- 14	- 315	- 16
Squirrel	1:1.5	36,900	24,600	- 213	- 142	- 277	- 185	- 315	- 210
Dove	1:6	145,300	24,200	+ 634	+ 106	+ 708	+ 118	+ 739	+ 123
Quail	1:50	145,300	2,900	+ 634	+ 13	+ 708	+ 14	+ 739	+ 15
Rabbit	1:10	182,200	18,200	- 37	- 4	- 143	- 14	- 217	- 22
Wild Turkey	1:100	36,900	370	- 213	- 2	- 277	- 3	- 315	- 3
Waterfowl[a]	1:15	183,400	12,226	- 213	- 14	- 277	- 18	- 315	- 21

[a] Migratory

ESTIMATED STANDING CROPS OF FISHES [a]

Category	Pre-Project			Post-Project		
	Pounds Per Acre	Acres	Total Pounds	Pounds Per Acre	Acres	Total Pounds
Catfish ponds	1,500	790	1,185,000	1,500	790	1,185,000
Lakes and Ponds (Multiple-use)	225	916	206,100	225	916	206,100
Outlets	100	735	73,500	100	735	73,500
Ponded Water Channels	75	21	1,575	75	21	1,575
Intermittent Channels	20	59	1,180	20	19	380
Weirs	0	0	0	30	147	4,410
Total			1,467,355			1,470,965

a/ Four-year level of protection

done with the 7-year level of protection, the effectiveness of the land treatment would be increased only slightly beyond that realized with the 4-year level of protection. The larger channels would reduce the damages from overbank flooding but effects from drainage would remain about the same. If land treatment is applied at the same rate as with the 4-year level of protection, erosion and sediment will not be reduced significantly. Water quality accordingly cannot be expected to improve with the higher level of protection.

The aesthetic value of the watershed could not be expected to improve to any greater degree than with a 4-year level because this, too, is directly related to the degree of land treatment.

WORKS OF IMPROVEMENT TO BE INSTALLED

Land Treatment Measures

Land treatment measures will be installed in accordance with soil and water conservation plans developed by the land users and the Northeast and the Catahoula Soil and Water Conservation Districts. These plans are based on the proper use of soils within their capabilities. To establish capabilities and limitations, soils are analyzed and classified by the use of soil surveys.

Soil scientists with the Soil Conservation Service prepare soil maps based on systematic borings. Soils are classified according to texture, structure, color, thickness of each distinct layer, and steepness of slope. The amount of erosion which has taken place and the rate water will move through the soil are estimated. Reaction is checked to determine the pH of the soil. The land capability class (see page 7) for each soil is determined. Conservation measures to treat the land adequately will be based on these capability classes. Detailed soil surveys will be made on 177,500 acres of land.

Land treatment measures necessary to adequately treat 92,100 acres of cropland, pastureland, and other land will be installed during the installation period. The remainder of the land in the watershed will have a complete land treatment program underway. Some of the major soil and water conservation measures to be installed and their functions are as follows:

Land Treatment Measures	Function
Conservation Cropping System	Growing crops in a sequence that will provide adequate cover to protect the soil from rainfall. Cropping system sequences vary according to needs of each field for protective soil cover. Cover and green manure are included as needed for soil protection and improvement.
Contour Farming	Cultivating sloping land so that plowing, preparing, planting, and cultivating is done on the contour, to reduce erosion and aid in water control.
Crop Residue Management	Leaving crop residues on the soil surface of cultivated fields to provide soil cover during periods when erosion is critical. Crop

Land Treatment Measures	Function
Crop Residue Management (continued)	residues are used as a mulch to intercept the impact of falling raindrops, therefore keeping soil detachment at a minimum. The tilth of the soil is increased and the water intake of the soil is increased.
Drainage Land Grading	Reshaping the surface of the land to be drained by grading to planned grades in order to improve surface drainage, provide more effective use of rainfall, and improve equipment operation and efficiency.
Drainage Mains and Laterals	Constructing open drainage ditches to designed size and grade to remove excess surface and subsurface water to improve the plant growing environments.
Pasture and Hayland Management	Using fertilization, weed control, and grazing practices to maintain a good, thick cover of grasses on the soil surface and produce high forage and livestock yields.
Pasture and Hayland Planting	Planting grasses and legumes to establish pasture or hayland to control erosion. After grasses are established, pasture and hayland management practices are used to maintain good grass cover.
Structures for Water Control (pipe drops)	Using structures where the force of flowing water is sufficient to cause erosion. These structures provide means of lowering the water from a higher elevation to a lower one in a short distance without causing erosion damage.
Forest Land Management	Proper using and protecting of forest land to provide increased realization of wildlife, recreation, timber, and watershed benefits through multiple use.

Land Treatment Measures	Function
Improved Cutting Practices	Harvesting and treating of forest stands to minimize disturbance, encourage growth of a new stand, and improve species composition.
Wildlife Wetland Habitat Management	Managing wildlife wetland habitat to provide food and cover for wildlife and to maintain soil cover.
Wildlife Upland Habitat Management	Managing wildlife upland habitat to provide food and cover for wildlife and at the same time provide soil cover.

Adequately treated land is land used within its capabilities, where the conservation practices that are essential to its protection and "planned" improvements have been applied. Providing necessary drainage and maintaining proper ground cover are the major problems in adequately treating land in the watershed. These measures are necessary to remove surface water at a rate adequate for healthy plant growth and to minimize erosion.

The assurance of optimum growth conditions will permit planting of recommended vegetation for ground cover and the subsequent production of maximum residue. On-farm mains and laterals, with project-type outlets, are necessary to provide drainage and flood protection needed to grow the basic agricultural crops economically.

Most cropland and pastureland have inadequate drainage systems. Adequate systems are necessary to provide the appropriate plant environment. Structural measures will decrease erosion and sediment yield and provide the opportunity to realize the benefits derived from the project. The Soil Conservation Service will be guided by the USDA policy of not encouraging the conversion of noncropland to cropland. The soil and water conservation districts will not encourage such conversions. Technical assistance as provided by the Soil Conservation Service will not be utilized to assist landowners in making such conversions.

Even though landowners are not obligated to install land treatment measures, past experiences have shown that these measures do materialize. Five watershed projects in the Louisiana delta have a land treatment program which has been underway for several years. Planned land treatment measures installed in two of the project areas ranged from 80 to 100 percent complete and in three other projects from 27 to 75 percent complete. However these latter three projects are still in the operation stage. The Agricultural Stabilization and Conservation Service administers programs that provide financial inducement for installing land treatment measure previously discussed.

Of the 92,100 acres to be treated adequately during the installation period, 72,400 acres are cropland, 16,600 acres are pastureland, and 3,100 acres are other land. In addition, conservation plans will have been prepared and some land treatment (not enough for the land to be adequately treated) begun on 36,600 acres of cropland and about 7,800 acres of pastureland.

Conservation measures to be planned and applied on cropland include conservation cropping systems, crop residue management, contour farming, drainage land grading, drainage mains and laterals, and other practices necessary to treat the land adequately. The control of headcutting and channel bank erosion where concentrations of water enter deeper channels will be accomplished through the installation of structures for water control (pipe drops). See figure 2.

Conservation measures to be planned and applied on pasture include pasture and hayland planting, pasture and hayland management, drainage mains and laterals, and other measures as needed to adequately treat the land. These measures will contribute materially to the establishment of a sound livestock grazing program.

Approximately 800 acres of multiple-use wildlife habitat on cropland and 1,600 acres on other land will be maintained, created, or improved during the installation of land treatment measures by establishing plants for wildlife food or cover. Technical assistance through the soil and water conservation districts program will be made available to landowners and operators to encourage and assist them in the proper development of measures that will improve wildlife habitat and harvest. Technical assistance will be given in the establishment and management of farm ponds. These measures will be accomplished on private land. Access to these features would be left to the discretion of the landowner.

Forest land will continue to receive fire protection under the Cooperative Forest Fire Control Program. Land treatment measures will be applied on 1,200 acres of forest land. These measures will contribute to watershed protection by reducing storm runoff and sediment production from susceptible upland soils, and will enhance the future economy of the watershed.

Management plans will also be developed on 8,600 acres of forest land. These plans will be directed toward resource management for forest products, wildlife habitat, and watershed protection. A forester will be assigned to the project to guide and assist landowners in installing the planned forestry measures.

The amount and estimated costs of treatment measures to be applied are shown in table 1. These measures will be installed during the 10-year installation period. Installation and maintenance of needed land treatment measures will continue after project installation.

IMPROVEMENT

Accelerating the present rate of technical assistance will make possible the following accomplishments during the 10-year installation period:

1. Approximately 350 land users will become soil and water conservation district cooperators and develop conservation plans for their land.

2. Soil and water conservation plans will be developed on 82 group enterprises by two or more land users on two or more operating units.

3. Revisions will be made to 100 soil and water conservation plans to bring them up-to-date in light of new technology.

4. Soil surveys will be made on 177,500 acres of the remaining land in the watershed.

5. Complete land treatment programs will be installed on 92,100 acres of cropland and pastureland and treatment begun on an additional 44,400 acres.

Structural Measures

Measures in this plan are comprehensive in nature, with full consideration given to the multiple-use concept of resource planning. The primary benefits that will accrue as a result of project installation will be from flood reduction and improved drainage. Prevention of damages to fish and wildlife while achieving these objectives is an important concern. Installation of structural measures will be completed during a 5-year period.

Approximately 222 miles of channels are necessary to achieve project objectives in reducing flood damages and inadequate drainage. Investigations indicate 36 miles are adequate and will not require work, 15 miles will be cleared leaving the ground cover and root armor, and 171 miles will be enlarged. The length and area to be cleared on each channel are shown on the tabulation on page 69. (See the coding system on page 110 for explanation of the type of channels, type of work, and flow conditions.)

Classification of the type of channel and flow characteristics of the project channels are shown on the following page.

IMPROVEMENT

Type of Channel	Length Project Channels	Length Requiring Work
	------------miles------------	
Manmade or previously modified	169	144
Natural or previously modified	47	36
Nonexisting or no defined channel	6	6
Total	222	186
Flow Characteristics		
Ephemeral	193	166
Intermittent	22	17
Ponded Water	7	3
Total	222	186

These flow conditions will remain the same after the project is installed, except for the increase in ponded water created by the installation of structures for water control (weirs).

Twenty-eight structures for water control (weirs), shown in figure 3, will be installed at strategic points in channels to reduce possible adverse effects to fish and wildlife habitat, reduce downstream sediment following construction, reduce growth of vegetation on the channel bottom during dry season, help preserve existing water supplies necessary to maintain agricultural production, and maintain aesthetics of the landscape. These structures will be installed prior to any work being performed on the upstream end of involved channels and laterals. They will create approximately 46 miles (147 surface acres) of permanent water.

The permanent fixed structure for water control (weirs) will be placed at the upper end of Channel M-20 (outlets end of Wiley's Brake) to insure a permanent water level in Wiley's Brake. The Soil Conservation Service with assistance from the Louisiana Wild Life and Fisheries Commission and the U.S. Fish and Wildlife Service will determine the final fixed elevation of the weir during the operations stage of the project.

Two grade stabilization structures (figure 4) will be installed and are integral parts of project channels. They will prevent headward and lateral channel erosion and will protect the channels and main outlets from excessive sedimentation, thereby reducing downstream turbidity and maintenance. The exact locations of these structures will be determined during the operations stage when additional survey data and foundation investigations are made.

Spoil from channels in forested areas will be stacked and shaped; spoil from channels in open areas will be spread. New sections of

LENGTH AND AREA OCCUPIED BY CHANNELS

Channel Number	Excavation			Clear Only			Adequate		
	Length	Right-of-Way Existing	Right-of-Way Planned	Length	Right-of-Way Existing	Right-of-Way Planned	Length	Right-of-Way Existing	Right-of-Way Planned
	miles	-------acres----------		miles	-------acres----------		miles	-------acres---------	
M-1	16.4	166	236	3.7	43	43	1.4	28	90
L-1A	2.2	5	15				1.5	4	4
L-1B	1.5	4	11						
L-1C	0.6	1	5	1.2	6	7	1.5	5	5
L-1C-1	3.1	8	26				0.7	3	3
L-1C-1A	0.5	1	3	0.3	2	3			
L-1E	1.2	2	10						
L-1F	0.1	6	7				2.2	18	18
L-1F-1	1.4	2	9				0.4	1	1
L-1F-2	1.9	10	14						
M-2	3.6	28	34	2.1	16	19	4.5	20	30
L-2A	2.1	5	15				1.9	6	6
L-2A-1	1.5	3	11				0.1	1	1
L-2B	3.0	5	21				1.2	6	8
L-2B-1	0.5	1	4						
L-2C	3.1	11	31				2.0	11	15
L-2C-1	1.6	4	11						
L-2C-2	0.2	1	2						
L-2C-2 Alt.	1.2	3	8						
L-2D	2.3	10	20				0.2	1	1
L-2D-1	0.6	1	4						
L-2E	0.6	1	4				0.1	0	0
L-2F	0.6	1	4						
L-2G	1.3	4	10				0.2	1	1
L-2H	1.7	3	11						
M-3	16.4	137	253	2.5	17	18	2.5	15	50
L-3A	1.7	13	16						
L-3A-1	0.3	1	2						
L-3B	3.7	38	53						
L-3B-1	1.5	5	12						
L-3B-1A	0.6	1	4						
L-3B-2	3.0	8	30	0.3	1	2			
L-3B-2A	1.0	4	7						
L-3B-2B	1.9	10	16						
L-3B-2B-1	0.7	4	6						
L-3B-3	2.4	6	17						
L-3C	0.7	2	6						
L-3D	6.0	45	57						
L-3D-1	2.0	12	18						
L-3E	5.4	26	44						
L-3E-1	1.0	2	7						
L-3F	4.9	14	43						
L-3F-1	1.9	10	14						
L-3G	2.5	13	24						
L-3G-1	2.1	14	16						
L-3G-1A	1.0	4	7						
L-3G-2	0.8	2	6						
L-3H	5.4	33	49						
L-3H-1	0.4	2	3						
L-3H-2	1.9	8	17						
L-3H-3	2.7	6	20						
M-4	1.0	2	7				2.8	4	4
L-4A	0.7	1	5				1.4	13	17
M-6	0.6	2	5						
M-7	2.1	6	18						
L-7A	0.4	0	3						
M-8	2.5	9	19						
M-9	3.2	16	43	0.8	5	6	5.2	35	64
M-9A	4.4	23	45						
M-10	2.0	3	15						
M-11	0.9	5	10						
M-12	1.6	3	13				2.9	21	25
L-12A	2.0	10	20						
M-13	0.8	5	6						
M-14	3.5	1	34				0.3	8	10
L-14A	1.9	5	14						
L-14B	0.9	0	7						
M-16	3.7	11	29						
M-17	4.2	13	43				1.0	11	16
M-18	2.2	11	22						
L-18A	0.8	2	6						
M-20	2.3	16	40	1.5	13	13			
M-21				2.6	25	25	2.0	23	47
M-21A	2.7	20	36						
M-22	1.9	6	14						
Total	171.0	876	1,727	15.0	128	136	36.0	235	416

channels will be constructed for better alignment of existing channels or to create more effective use of existing land patterns and drainage systems. However, existing channel alignment will be given priority in order to preserve the environment and preserve aesthetics of the landscape.

Where the main channel joins a lateral of near equal depth, short sections of the main channel downstream from the junction will be deepened to intercept sediment. Short recesses for sediment interception will be installed in laterals where the main channel is considerably deeper.

As the channel work is being done, berms will be maintained and spoil will be placed in a manner to allow operation and maintenance equipment access to the channel. Where necessary, culverts will be placed in ditches entering project channels to allow continuity of access. Structures for water control (pipe drops) will be constructed to permit vehicular crossings. Figure 1 shows a typical profile and cross section of a channel.

Field reviews were made by biologists of the Louisiana Wild Life and Fisheries Commission, the U.S. Fish and Wildlife Service, and the Soil Conservation Service. Many of the suggestions from these reviews were incorporated into the plan. Certain reaches of channels, or in some cases entire channels, were eliminated where excavation or clearing would disturb valuable fish or wildlife habitat. Channel work was eliminated on lower ends of channels entering major streams or lakes so that the undisturbed areas will have a filtering effect on runoff. Specific locations of some of the structures for water control (weirs) were determined so that they would more effectively reduce adverse downstream effects and benefit streamside wildlife.

Where the lower ends of channels entering Boeuf River, Tensas River, and Bayou Macon proved adequate, work was eliminated as far upstream as possible. Channels M-1, M-2, M-3, M-4, M-4A, M-9, M-12, M-17, M-20, and M-21 are surveyed channels where this determination has already been made. These adequate sections are shown on the Project Map, Figure 7. Quantities were estimated on Channels M-6, M-7, M-8, M-10, M-11, M-13, M-16, and M-22, and adequacy checks will be made prior to construction.

Project channels will occupy 2,279 acres of rights-of-way of which 416 acres are in adequate channels and 1,863 acres will be disturbed by channel work. Approximately 823 acres to be disturbed are occupied by existing channels, berms, and spoil. Therefore, approximately 1,040 acres of additional area will be needed to install project measures. This 1,040-acre increase comprises about 393 acres of open land, 383 acres of wooded channel banks, and 264 acres of forest. The 393-acre increase in requirement of open land is for spoil deposition during channel excavation and this acreage is included in rights-of-way computations. However, when the spoil is spread, 379 acres will revert to cropland resulting in a net loss of 14 acres.

Several alternatives for establishing vegetative cover on the disturbed areas in forest land were evaluated by the Louisiana Wild Life and Fisheries Commission, U.S. Fish and Wildlife Service, and Soil Conservation Service. Spoil in forest land will be planted with hardwood seedlings. Grass will be established on the berms.

Excavation will be done from only one side of the channel with consideration given to providing most shade to water during the summer months.

Efforts will be made to maintain trees and woody growth along channels for aesthetic purposes. There are 39 miles of channel to be worked through forest land and 80 miles through areas where woody vegetation exists along the banks adjacent to cultivated land. Trees inside the channel rights-of-way may be aesthetically pleasing as individuals because of their large size, form, color, leaf texture, bark, or because of their flowering or fruiting characteristics. As many of these trees as possible will be left, considering requirements for construction, operation, and maintenance. (Refer to figures 5 and 6).

Vegetation will be established on rights-of-way and disturbed areas along project channels after heavy or plant-destroying equipment has ceased travel on the berm. Depending on the season of the year, the crops being grown, and desires of the farmer, the spoil may or may not be spread on open land soon after construction. Spoil in forest land will be shaped and seeded. Depending upon soil type and season of the year, vegetative species such as the following can be used - Common bermudagrass, Pensacola bahiagrass, Sericea lespedeza, Browntop millet, ryegrass, and fescue.

After the ground cover is established, hardwood seedlings will be established on 134 acres of spoil during the dormant season using water oak, willow oak, nuttall oak, and sweet pecan. Species planted on the spoil will depend upon the availability of seedlings and soil types. This will mitigate 48 percent of the 277 acres of hardwoods lost as a result of construction.

Alteration, modification, or reconstruction of some existing facilities such as bridges, culverts, and pipelines will be necessary to insure proper functioning of planned structural measures. The work on the bridges involves the enlargement of the channel cross section by excavating under the bridge, reinforcing one or more bents of pilings, or lengthening a bridge in order to widen the channel. Work on the culverts involves replacing existing culverts with larger ones, lengthening existing culverts, or lowering the grade of existing culverts. Work on the pipelines involves the lowering or casing of existing pipelines. No bridges, culverts, or pipelines will be relocated.

This alteration, modification, or reconstruction includes, but is not limited to, 4 bridges and 25 culverts on State and Federal highways, 80 bridges and 70 culverts on parish and private roads, and pipelines at 30 locations. The work will be done concurrently with channel construction. The specific location of existing facilities to be altered are shown on the design profiles and cross sections in the working files. Replacement of any State and Federal highway bridges or culverts will be coordinated with the Louisiana Highway Department early in the design phase prior to construction. Designs will be in accordance with current standards for traffic and type of highway.

There are no relocations of residences or businesses required.

All clearing wastes and construction debris will be buried, burned, or removed from the construction site. Burning, if necessary, shall be conducted in accordance with the Louisiana Air Control Commission regulations and other applicable laws governing such operations. Noise levels will be monitored, and standards set by the Occupational Safety and Health Act will be followed.

A letter from the Curator of Anthropology at Louisiana State University indicates that no known archaeological importance will be affected by the project.

The locations of archaeological sites along specified channels of the East Franklin Watershed were obtained by archaeological survey along the margins of the channels. The survey was conducted by archaeologists of the Geosciences Department and Research Institute of Northeast Louisiana University.

None of the 34 archaeological sites located along or near the specified channels will be affected by proposed works. However, a careful watch for buried cultural remains will be maintained. If artifacts or other items of prehistoric or historic archaeological interest are uncovered during construction, the archaeologists at Northeast Louisiana University, the National Park Service, the Curator of Anthropology, and the Historical Preservation Officer will be notified and given an opportunity to evaluate and make recommendations for salvage or mitigation before construction continues. The Advisory Council on Historic Preservation will be afforded an opportunity to comment if such sites are determined to be eligible for inclusion in the National Register of Historic Places in accordance with the "Procedures for the Protection of Historic and Cultural Properties."

The State Historic Preservation Officer's letter dated January 9, 1975 states that his department does not know of any sites on the National Register of Historic Places or being actively nominated to the National Register which would be affected by this proposed project.

EXPLANATION OF INSTALLATION COSTS

The total installation cost of the project is estimated to be $9,224,300, of which $3,155,430 will be borne by Public Law 566 funds and $6,068,870 by other funds (see table 1). Included in the total project cost is $5,179,300 for land treatment measures and $4,045,000 for structural measures.

Land Treatment Measures

The installation of land treatment practices will insure the timely realization of project benefits and will provide proper treatment of the land for protection and improvement. This plan provides for the installation of these measures within a 10-year project installation period. Installation costs of $5,179,300 will be borne by individual landowners and operators; this includes $52,500 for the multiple use of cropland and other land as wildlife habitat.

The cost of technical assistance to continue and accelerate the going program of installing land treatment measures is estimated to be $1,206,100 during the 10-year installation period. Of this amount, $1,027,200 will be provided by Public Law 566 funds for acceleration of the going program. The remaining $178,900 will be furnished by other funds, including a going program input of $172,500 provided through the Soil and Water Conservation District Program; Cooperative Forest Management funds $6,400; going Cooperative Forest Fire Control funds $17,700; and funds contributed by Sponsors $17,500.

Structural Measures

The total cost of installation of channel work is $4,045,000, of which $2,058,200 is for construction, $143,600 is for engineering services, $1,424,900 is for land rights, and $418,300 is for project administration. The cost of this work, which includes excavation and clearing, appurtenant grade stabilization structures, structures for water control, and vegetative plantings is shown in table 1. The allocation of these costs to purposes is shown in table 2A. These costs include construction, engineering services, and other costs.

The costs of measures were estimated using current prices of work of comparable size and complexity and adjusted to local conditions. This was further modified by adding a contingency of 20 percent to provide a reasonable margin to cover unexpected costs.

The construction cost consists of $1,111,000 for excavation and clearing, $105,300 for structures for water control (pipe drops), $585,800 for structures for water control (weirs), $249,900 for establishing vegetation, and $6,200 for grade stabilization structures.

The land rights cost consists of $213,600 for the value of land, surveys, and legal fees; $125,400 for modification or replacement of 4 State and Federal bridges, $464,400 for 80 parish and private bridges, $36,000 for 25 State and Federal culverts, $69,300 for 70 parish and private culverts; and $516,200 for alterations, modifications, or reconstruction of existing miscellaneous facilities such as pipelines and utilities. No additional land rights are considered necessary for the installation of appurtenant structures. They will be installed in the channel rights-of-way.

The cost of all engineering services ($143,600) includes the direct costs of work to be done by engineers and technicians in relation to structural measures. The work consists of surveys, investigations, designs, and preparation of plans and specifications including vegetative requirements. The cost of these services will be paid by Public Law 566 funds.

The Service and the Sponsoring Local Organization will be responsible for the total cost of items of project administration that each incurs. These costs (estimated to be $418,300) are the administrative costs associated with the installation of structural measures. The Sponsors will bear costs for administration of contracts ($20,590) and for such inspections ($2,030) they believe necessary to assure themselves the work is being done according to their interest. The Service will bear the costs of inspections ($205,900) that are necessary to protect the interest of the Federal Government and will prepare certificates of completion. Also, the Service will bear the cost of government representatives and other project administration services it incurs ($189,780). A project agreement will be entered into between the Service and the affected Sponsors before any work is begun.

All structural measures are multiple-purpose, serving both flood prevention and drainage. The cost of structural measures excluding project administration is $3,626,700 of which $1,971,500 is allocated to flood prevention and $1,655,200 is allocated to drainage. The cost of these channels was allocated between these two purposes in accordance with standard procedures. This results in 54.4 percent of the cost being allocated to flood prevention and 45.6 percent to drainage.

A schedule of obligations for the 10-year installation period, including both land treatment and structural measures, is shown on page 75.

East Franklin Watershed, Louisiana

SCHEDULE OF OBLIGATIONS
(Dollars)[a]

Year	Items	PL-566 Funds	Other Funds	Total Funds
1st	Construction	527,500	155,800	683,300
	Engineering Services	47,800	-	47,800
	Land Rights	-	469,200	469,200
	Project Administration	98,920	5,650	104,570
	Land Treatment	-	400,820	400,820
	Soil Surveys	14,800	3,500	18,300
	Technical Assistance	84,400	16,780	101,180
2nd	Construction	684,700	202,200	886,900
	Engineering Services	61,900	-	61,900
	Land Rights	-	568,100	568,100
	Project Administration	138,490	7,920	146,410
	Land Treatment	-	400,920	400,920
	Soil Surveys	14,800	3,500	18,300
	Technical Assistance	91,000	16,780	107,780
3rd	Construction	376,750	111,250	488,000
	Engineering Services	33,900	-	33,900
	Land Rights	-	387,600	387,600
	Project Administration	98,920	5,660	104,580
	Land Treatment	-	400,820	400,820
	Soil Surveys	14,800	3,500	18,300
	Technical Assistance	93,700	16,780	110,480
4th	Project Administration	39,570	2,260	41,830
	Land Treatment	-	400,820	400,820
	Soil Surveys	14,800	3,500	18,300
	Technical Assistance	95,400	16,780	112,180
5th	Project Administration	19,780	1,130	20,910
	Land Treatment	-	400,820	400,820
	Soil Surveys	14,800	3,500	18,300
	Technical Assistance	96,900	16,780	113,680
6th	Land Treatment	-	393,800	393,800
	Technical Assistance	94,900	15,500	110,400
7th	Land Treatment	-	393,800	393,800
	Technical Assistance	97,300	15,500	110,400
8th	Land Treatment	-	393,800	393,800
	Technical Assistance	101,400	15,500	116,900
9th	Land Treatment	-	393,800	393,800
	Technical Assistance	99,100	15,500	114,600
10th	Land Treatment	-	393,800	393,800
	Technical Assistance	99,100	15,500	114,600
	TOTAL	3,155,430	6,068,870	9,224,300

a/ Price Base 1974

May 1974

EFFECTS OF WORKS OF IMPROVEMENT

Flood Prevention and Drainage

Project measures will provide a 4-year level of protection to crops and pastures in the benefited areas. This means that the average time between significantly damaging storms will be more than 4 years. Average annual damages will be reduced about 78 percent. Peak stages will be increased in project channels and downstream from project channels. The increases in peak stages at selected points are shown in the following tabulation:

Stage Changes from Selected Storm
Frequencies at Key Stream Locations
East Franklin Watershed

Stream Location	Peak Stage Increase 4-year	10-year	100-year
	------------	feet	------------
Channel M-1, Station 0+00	0.2	0.2	0.1
Channel M-3, Station 43+00	.2	.2	.1
Channel M-4, Station 147+00	Less than .1		
Channel M-9, Station 94+00	.1	.1	.1
Channel M-12, Station 150+00	.1	.1	.1
Channel M-14, Station 25+00	.1	.1	.1
Channel M-17, Station 50+00	.1	.1	.1
Channel M-21, Station 121+00	.2	.1	.1
Ouachita River Jct. Boeuf River	0	0	0
Bayou Macon Jct. M-12	0	0	0
Bayou Macon Jct. M-9	0	0	0
Bayou Macon Jct. M-4	0	0	0
Bayou Macon Jct. M-3	Less than .1		
Big Roaring Bayou Jct. M-14	.1	.1	.1
Tensas River Jct. M-16	.2	.1	.1
Tensas River Jct. M-21	.2	.1	.1
Tensas River Jct. Bayou Macon	.2	.1	.1
Black River Jct. Tensas River	0	0	0

The tabulated changes in stages include the effects of all proposed and installed Public Law 566 projects in the drainage areas of the streams which will serve as watershed outlets.

The project will provide protection to agricultural land from the storm which is expected to occur on an average frequency of once

every 4 years. The runoff from the 4-year frequency storm will not be contained wholly within channel banks, but it will be back within channel banks 24 hours after the storm ceases. Runoff from storms of greater magnitude will inundate land for periods longer than 24 hours. However, the period of inundation would be much shorter than the period under present conditions, thereby reducing the probability of crop loss. Also, the flood hazard duration to roads would be reduced; vehicle traffic will be back to normal much sooner.

The area benefited by Channel L-1B is designated a limited use area. The maximum protection that can be provided is to short-season crops or those than can be planted and reach maturity during the period June 1 through November 30. Still, some detrimental flooding will occur on the average of 2 out of every 5 years.

Future land use in the watershed under without-project and with-project conditions is shown in the following tabulation:

	FUTURE WITHOUT PROJECT		FUTURE WITH PROJECT	
Land Use	Acres	Percent	Acres	Percent
Cropland	117,900	60	117,900	60
Pastureland	27,400	14	27,400	14
Forest Land	36,900	19	36,600	19
Other[a/]	13,800	7	14,100	7
TOTAL	196,000	100	196,000	100

a/ Includes roads, channels, bayous, lakes, communities, farmsteads, rights-of-way, etc.

The preceding table reflects land use changes from one category to another. Project installation will cause an additional 14 acres (see page 69 under WORKS OF IMPROVEMENT TO BE INSTALLED) of open land, 264 acres of forest land, and 383 acres of wooded channel banks to be occupied by channel rights-of-way. These changes indicate that there will be an overall increase in the "other land" category because of additional rights-of-way requirements in open land and forest land. However, since wooded channel banks are already in the "other land" category, there will be no changes shown because of this increase.

About 37,000 acres of forest land have been cleared in the last 15 years. The 10,000-acre block of bottom land forest is the only large area remaining that is subject to being cleared and converted to cropland. One project channel is located on the southwest edge and another on the northern edge of this large forested tract. One channel, M-16, enters the tract approximately 0.5 mile from the western edge of the forest land at Louisiana Highway 4 and extends 0.3 mile in a northwesterly direction then 0.5 mile in a westerly

direction. The other channel, M-14, enters the tract approximately 1 mile west of the Franklin-Tensas Parish line and extends 1.5 miles through the forested tract along a gravel road. No other project channels are located internal to this large forested tract and the project would not change in the present conditions. The better drainage on the land adjacent to these tracts will improve the economic returns on the land presently being cropped. The soils are highly productive and returns on soybeans are about $35 per acre compared with $7 per acre for timber production and wildlife leases. Although these returns could provide some economic inducement to convert the forest land to cropland, the present flooding and drainage problems will remain and the economic risk of producing crops should remain unchanged. No clearing was assessed to the project since present conditions would not be changed and future land use conversions would be contingent upon floodwater removal and improved drainage conditions by other means.

Cotton and soybeans make up 24 and 66 percent, respectively, of the cropland. The other 10 percent is used for corn, grain sorghum, oats, rice, orchards, wheat, truck crops, and idle land. Floodwater and drainage effects are discussed together because the problems are inseparable. Channels which remove floodwater also remove drainage water.

In general, installation of the project will reduce the high risks involved in farming and make it a more profitable business enterprise. Farmers will be able to:

1. Improve soil conditions.

2. Plant in early spring, thus getting more uniform, increased plant populations.

3. Control weeds and grasses better.

4. Harvest at favorable times.

5. Produce better quality and higher yielding crops.

Both the land treatment program and the forest management program will receive emphasis. Proper management and protection of cropland will improve soil conditions by allowing better movement in the soil of air and water. Forest lands will be managed under the multiple-use concept.

Improved drainage will allow better timing of cultural practices. Both planting and harvesting can be done more efficiently at opportune dates. Large equipment can be used on the more level, better-drained fields; planting will be done early, thus increasing the chances for more uniform plant populations. Also, this will make available more days during critical crop growing periods of maximum utilization of equipment and other committed factors of production. Because wetness

is reduced, the frequency of replanting will be reduced, and land treatment measures can be applied more effectively. This will promote crop residue usage, reduce fall plowing, and permit better rotations of crops in the problem areas. In turn, these practices will conserve soil fertility, reduce erosion, and help control weedy growth.

Pasture grasses will grow faster and provide better, more desirable forage. Unpalatable, water tolerant weeds will not thrive as well under the better-drained conditions produced by project installation. As a result, stocking rates for livestock will increase and the pastureland will be used nearer its potential.

About 76,200 acres of cropland and pastureland will be benefited (see the benefited area on the Project Map, Figure 7). Overall, improved farming efficiency resulting from project installation will reduce the average annual fixed cost of production about $116,700; also, the reduced flooding, improved soil conditions, and better, more timely management practices will improve the quality of products marketed. The average annual increase in net returns due to improved crop quality amounts to about 6 percent or $57,000.

On the basis of the 4-year level of protection, the estimated average annual reduction of crop and pasture floodwater damages and loss of net returns due to impaired drainage amounts to $849,600. Of this amount, $462,200 was allocated to direct flood damage reduction benefits and the remaining $387,400 was allocated to the recovery of losses of net returns attributed to improved drainage. Average annual flood damages to roads will be reduced an estimated $40,500, and indirect project benefits will be an estimated $54,300. In addition, average annual benefits from more intensive use of land as a result of flood prevention and improved drainage would amount to approximately $94,400.

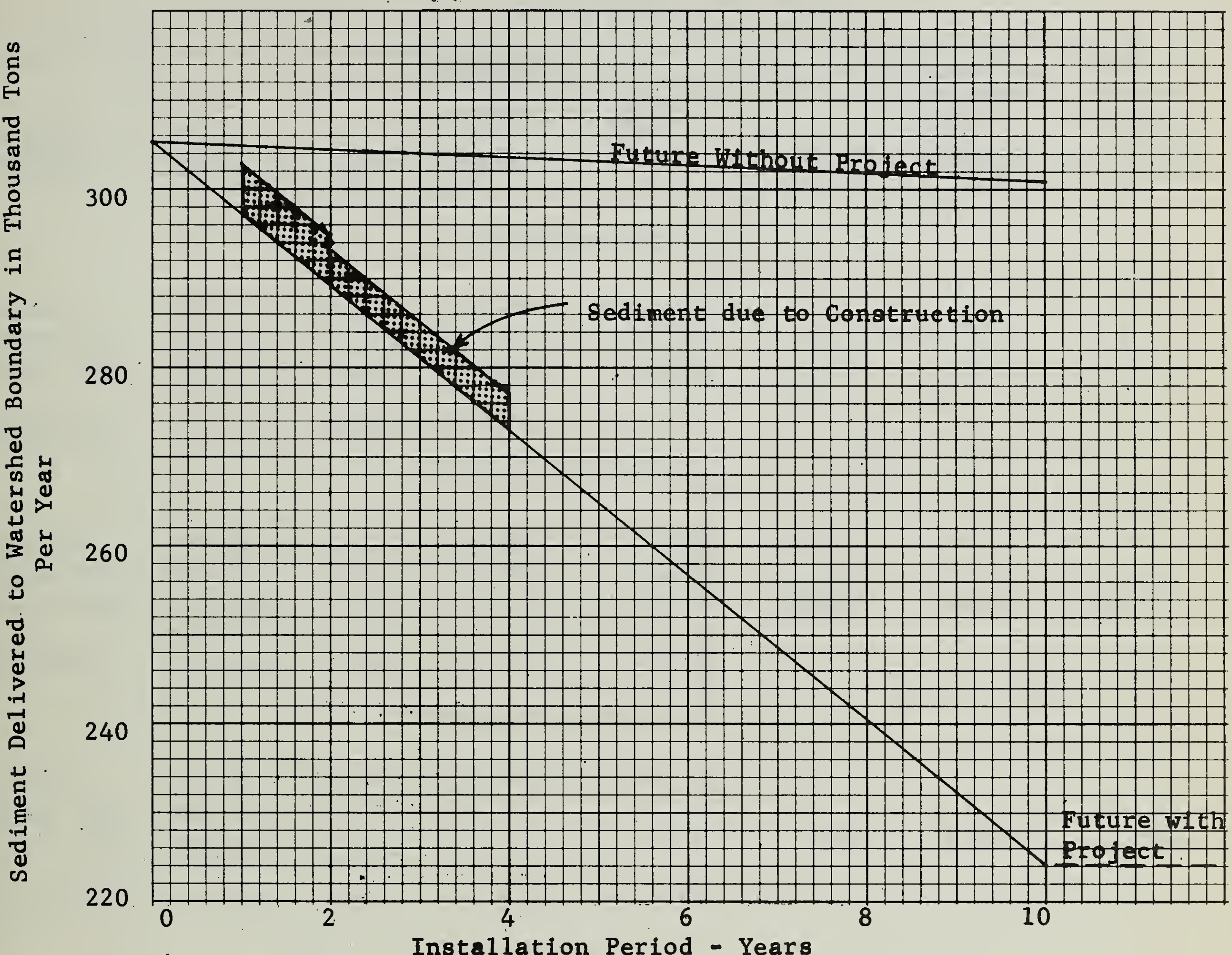
Erosion and Sediment

Erosion and the resulting sedimentation and turbidity will decrease with the installation of the planned project measures. Sheet erosion over the entire watershed will be reduced from 4.4 tons per acre per year to 4 tons per acre per year. This is a reduction of 9 percent.

Sediment being delivered to Boeuf River, Tensas River, Bayou Macon, and minor streams will be reduced approximately 400,000 tons by project measures during the 10-year project installation period. Annual sediment being delivered to these points will be reduced 26 percent, from 301,000 tons to 224,000 tons. This reduction not only reflects the reduction in sheet erosion but also reflects the trapping effect of the structures for water control weirs) that will be installed. The graph and tabulation on the following pages will illustrate these reductions by evaluation units and areas.

Average annual concentrations of suspended sediment will be reduced from a calculated 687 mg/l to 505 mg/l.

EAST FRANKLIN WATERSHED
Sediment Delivered to Watershed Boundary



Reduction in Sediment Yield From the Watershed
During Installation Period
(tons)

Year	Future Without Project	Future With Project	Reduction
1	305,000	303,500	1,500
2	304,500	295,000	9,500
3	304,000	287,000	17,000
4	303,500	278,000	25,500
5	303,000	264,000	39,000
6	302,500	256,000	46,500
7	302,000	248,000	54,000
8	302,000	240,000	62,000
9	301,500	232,000	69,500
10	301,375	224,110	77,265
Total	3,029,375	2,627,610	401,765

Summary of Erosion and Sediment Data
East Franklin Watershed

Watershed Condition	Total Sheet Erosion	Sediment: Total	Sediment Delivered by: Project Channels	Sediment Delivered by: Other Channels	Construction: Erosion	Construction: Sediment From Erosion	Sheet Erosion Trapped By Weirs
	- - - - tons per year - - - - - - - - -				- - - - - - - tons - - - - - - -		
EVAULATION UNIT I							
Present	259,115	81,231	67,246	13,985	-	-	-
Future W/O	256,651	80,251	67,229	13,022	-	-	-
Future With	231,810	54,278	42,494	11,784	18,081	5,424	18,211
Reduction	27,305	26,953	14,752	2,201			
EVALUATION UNIT II							
Present	276,254	85,854	72,953	12,901	-	-	-
Future W/O	273,612	84,760	73,161	11,599	-	-	-
Future With	246,455	49,866	39,643	10,223	22,701	4,540	26,429
Reduction	29,799	35,988	33,310	2,678			
EVALUATION UNIT III							
Present	182,152	76,504	31,796	44,708	-	-	-
Future W/O	180,415	75,774	31,791	43,983	-	-	-
Future With	163,021	67,034	27,272	39,762	5,468	3,828	1,435
Reduction	19,131	9,470	4,524	4,946			
EVALUATION UNIT IV							
Present	149,227	61,183	26,570	34,613	-	-	-
Future W/O	147,781	60,590	26,429	34,161	-	-	-
Future With	134,384	52,932	21,884	31,048	2,107	1,306	2,165
Reduction	14,843	8,251	4,686	3,565			
TOTAL FOR WATERSHED							
Present	866,748	304,772	198,465	106,207			
Future W/O	858,459	301,375	198,610	102,765			
Future With	775,670	224,110	131,293	92,817	48,357	15,098	48,240
Reduction	91,078	80,662	57,272	13,390			
% Reduction	10.5%	26.5%	28.9%	12.6%			

Several practices are planned which will reduce the amount of sediment delivered from channel construction. Vegetative plantings on the disturbed soil will be accomplished immediately after construction. Vegetative cover will be established within 90 days of construction. The photographs on the following page illustrate the effectiveness of these practices. The structures for water control (weirs) will be constructed prior to the channel excavation. This will trap a large percent of any sediment produced during construction. It is estimated that an average of 5,000 tons of sediment per year for 3 years will be generated by construction. This sediment will be offset by the reductions that will be achieved by land treatment and structural measures. Photographs on page 84 illustrate land treatment practices that will be applied.

Other design features and construction methods have been instituted to reduce erosion and sedimentation from the channels. Channel design velocities will not cause erosion of materials to be encountered during construction. Channel side slope designs will assure stable banks. Usually, construction will disturb only one bank. Trees left on undisturbed banks and in channel rights-of-way will help to shade out undesirable growth inside the channel and reduce maintenance of vegetative control within the channel. Where possible, project channels will empty into undisturbed vegetated channels which will act as filters. Details of these measures are in the Engineering Investigation and Analyses section of the work plan.

Fisheries

Twenty-eight structures for water control (weirs) will be installed resulting in 46 miles which is 147 acres of permanent water. These structures will have a beneficial effect on the aquatic environment within the channels and downstream. Although the 147 acres of water will not be high quality fish habitat, they will support a standing crop of about 30 pounds per acre. The water in each pool will provide additional habitat for wading birds, amphibians, and reptiles. Game and nongame species will have additional watering sites. As a result of the shallow water, occasional growths of aquatic weeds may occur.

The 28 weirs totaling 147 acres of permanent water will have an average surface area of 5.2 acres, the average length will be 1.7 miles, and the average depth will be 1.5 feet. As a result of the shallow water at these sites, and the small size of the impoundments, they offer poor quality water-based recreation. Also, because of their location, they are not conveniently accessible to the general public. For these reasons, no recreation developments are anticipated along the banks.

Typical channel section about 1 week after construction. Note construction has destroyed temporarily the vegetation along one bank.

Typical channel section in same area as above about 1 year after construction. Note vegetation initially destroyed by construction is now well established.

Crops on the contour reduce erosion and sediment

A good winter cover crop protects the soil from winter rains.

EFFECTS

Periodic blue-green algae blooms could occur during extended periods of low flow. However, the drainage area of the weirs is large enough to provide a frequently flushing action except during extended dry periods. Anabaena and Microcystis would be the most likely algae species associated with prolonged dry periods. If these blooms materialize, the algae give off a toxic substance which can be fatal to fish also; when the bloom dies, the process of decomposition can cause an oxygen shortage and be fatal to fish. The Sponsoring Local Organization will be responsible for identifying problem areas and will consult with local fisheries biologists for the action needed to alleviate the problem. Copper sulfate or its derivatives will be used to control the algae blooms. Other impounded areas in the watershed do not presently have aquatic weed problems that have developed to nuisance levels.

Three miles of channels containing ponded water will be modified. Existing quality and quantity of fisheries are low. Losses of bank and in-channel cover and disruption of the benthic community will occur. Water temperatures in the summer months will be increased about 5 degrees Fahrenheit. A slight lowering of the biological productivity will result during construction. Recovery of productivity will begin when construction ceases. Complete recovery to the current biological productivity will depend on the recovery of the benthic community, recovery of adequate cover in the channel, and recovery of the current water quality levels. This will take about 1 year following construction. The species diversity is not expected to change because the existing species such as carp, gars, shad, and bullheads can tolerate low quality habitat.

Effects of project construction of the fisheries in 17 miles of previously modified intermittent channels will be similar to that described for the channels with ponded water. Water temperature will not be a critical impact on intermittent flow channels because these channels have water in them only during winter, early spring, and during periods of storm water runoff.

One hundred and sixty-one miles of ephemeral channels will be worked. Presently, a fishery does not exist because ephemeral-flow channels contain water only during periods of surface runoff. Limited production of fish food organisms occurs in these channels and consists mainly of larval forms of insects. This production will be temporarily interrupted during construction.

Even though individual channels will experience some increase in sediment during construction, the net effect over the watershed should be a decrease. Turbidity in Boeuf River, Bayou Macon, and Tensas River at the project channel outlets may be increased temporarily during construction. However, the present species of fish will tolerate the slight changes in water quality, and neither the diversity nor the standing crops of fish will be affected.

Turbidity levels in Bayou Macon "cutoff No. 3" during construction of Channel M-12 will be dependent upon the sequence of the installation of the land treatment measures in comparison to the construction schedule and other conditions. Four of the most important conditions are precipitation patterns, soil types, channel flow, and the length of time required for the disturbed areas to revegetate. No excavation will be done on the lower 2.8 miles of Channel M-12. This undisturbed section will help to filter the water entering the cutoff. Excavation will be done on one side only for a distance of 1.6 miles on the upper end of the channel. Channel L-12A is a lateral to the M-12 system. It will enter M-12 in the undisturbed section 1.2 miles above "cutoff No. 3" and excavation will be done on one side only for a distance of 2 miles.

Project-induced turbidity increases will reduce the game fish population in Bayou Macon "cutoff No. 3" if installation of land treatment measures lags in the drainage area before channel construction begins and if measures to control construction-generated turbidity are not installed. This niche of game fish populations would be filled by commercial species such as carp, catfish, and shad. Game fish currently make up 45 percent of the standing crop, and the entire fish population is "in balance." Game fish could be reduced to about 20 percent of the standing crop if the turbidity caused by construction is not offset by the installation of land treatment measures and measures to reduce construction-induced erosion. A monitoring program, which includes fish population samples, will detect any changes in standing crop and species composition. Should a significant reduction or species composition change occur, the loss will be restored by completely renovating existing populations and restocking the cutoff after turbidity levels in the cutoff have recovered to an acceptable level. Restocking would be done by acquiring fish from the Fish and Wildlife Service of the U.S. Department of the Interior. The net effect of the land treatment measures after project installation should result in a reduction of sediment and turbidity and subsequent recovery of water quality in Bayou Macon "cutoff No. 3."

The current land use of the drainage area of Channel M-12 is 600 acres of forest land, 2,935 acres of cropland, and 980 acres of pastureland. The 600 acres of forest land will remain unchanged under project conditions. The land clearing trend has stabilized and the 600 acres are scattered in small tracts. In addition to timber production, these forested tracts are used as a source of firewood by the owners, and as habitat for many game and nongame species of wildlife.

The temporarily increased turbidity levels that will occur during construction in Bayou Macon "cutoff No. 2" will not significantly affect the fish population because of the high percentage of gizzard shad. The game fish (bluegill, spotted sunfish, warmouth, and chain pickerel) will tolerate increased turbidities without deleterious effects. An

undetermined reduction of phytoplankton will occur at the outlets of the project channels but will start recovering when the disturbed areas revegetate and turbidities in the channels are comparable to existing conditions. This should take from 3 to 6 months.

No significant land use changes will occur in the drainage areas of M-7, M-8, M-9, and M-10 after construction. The current land use is 1,450 acres of forest land, 5,475 acres of cropland, and 1,825 acres of pastureland. The forest land occurs in small scattered tracts. Land use in the drainage area has been relatively stable for the past several years.

Channel M-14 outlets into the lower portion of Big Lake. The lower one-fourth mile of this channel between the lake and the watershed boundary is adequate and no excavation is planned on this portion. The only change in water quality as a result of the project will be a temporary increase in turbidity during construction. Agricultural runoff entering Big Lake will be the same for pre-construction and post-construction. No adverse effects to the fisheries will occur.

Eutrophication or aquatic enrichment in downstream environments is not expected to change as a result of the project. Farmers in the project area will increase their use of fertilizers by an estimated 1,300 tons annually. The 1,300 tons applied annually will be a result of project implementation which will result in more intensive agricultural operations because of better drainage and reduced flood water damages. Historically, increases in nutrients have occurred in downstream areas when intensive agriculture is the dominant land use. Amounts of nutrients in these areas are directly related to the amount of soil erosion. The application of land treatment measures in this watershed will reduce erosion and consequently, a reduction in nutrient levels should also occur in downstream environs.

Soil fertility under continuous cropping will decline without the use of fertilizers. Fertilizers presently account for about one-third of the production of our total food supply.[1/]

Phosphates enter the water from many sources including sewage treatment plants, barnyard wastes, use of detergents and surfactants, biological wastes, and agricultural fertilizers. Excessive amounts of phosphate will result in eutrophic or overfertilized conditions in aquatic ecosystems, especially if large amounts of nitrates are present.[2/]

1/ U.S. Department of Agriculture, Soil Conservation Service, "Water Pollution from Agriculture," Missouri's All Employees Training Conference - Framework for the Future (Unpublished compilation of speeches and training sessions made at the training conference, 1972), pp. 42-51.

2/ Water Analysis Handbook (Ames, Iowa: Hach Chemical Company, 1973).

Soil particles have a high affinity for holding onto phosphate molecules.3/ Phosphates are relatively insoluble in water, resulting in low concentrations under normal conditions.4/ The extensive use of fertilizers in farm ponds for fish production indicates that land runoff is a poor source of the needed phosphorus. Erosion of topsoil is the main source by which phosphorus from farmland reaches streams.5/

Nitrate represents a common and stable state of nitrogen found in water. Nitrate-rich effluents discharged into waters can degrade water quality by encouraging excessive growth of algae.6/ The Soil Department at Washington State University studied nitrate content of well water in areas where different application rates of fertilizer had been used. They found that high nitrate in the well water was not a direct consequence of heavy fertilizer use.7/

The best control methods for preventing fertilizer nutrients from entering aquatic ecosystems are to use only the needed amount of fertilizer and to use management practices that will reduce erosion to a minimum. The project will be conducive to such practices.

A monitoring program has been developed for this watershed to determine preproject and postproject water quality conditions, fish populations, and pesticide levels. Estimated changes in fish populations are shown on page 61. This program will include a close study of land use changes that occur in the drainage areas above each sampling station. The three sample stations are located on (1) the lower reaches of Deer Creek, (2) Bayou Macon "cutoff No. 2," and (3) Bayou Macon "cutoff No. 3." This program is being conducted jointly with the Feeds and Fertilizer Laboratory at Louisiana State University, the Louisiana Wild Life and Fisheries Commission, the U.S. Fish and Wildlife Service, the Louisiana Board of Health, and the U.S. Geological Survey.

3/ U.S. Department of Agriculture, Agricultural Research Service, Wastes in Relation to Agriculture and Forestry (Washington: U.S. Government Printing Office, 1968), pp. 37-39.

4/ Richard H. Wagner, Environment and Man (New York: W. W. Norton and Company, Inc., 1971), p. 122.

5/ U.S. Department of Agriculture, Wastes in Relation to Agriculture and Forestry, op. cit., p. 38.

6/ Water Analysis Handbook, loc. cit.

7/ Institute of Agricultural Sciences, Nutrient Input to Soils From the Air, Circular 415 (Washington: Washington Agricultural Experiment Station).

The monitoring program will measure fish populations and pesticide residues in fish tissue, channel soil, and water. Nutrients from fertilizers will be measured in the aquatic environment to identify the amounts of nitrogen and phosphorus. Water samples will be analyzed to determine suspended solids, turbidity, temperature, sulfates, pH, oxygen, color, and hardness. The project will be monitored for 2 years preproject and for a sufficient time after completion of construction until conditions stabilize. The information will be used to determine if the project will cause significant increases in the deterioration of water quality and provide a means for determining appropriate modifications that could be made.

Wildlife Resources

Squirrels are dependent on mast production for their food supply. The later stages of plant succession are more conducive to high squirrel populations. Squirrels maintain a higher population on existing habitat conditions along channel rights-of-way than would be present after construction. After about 20 years, trees should be matured to restore this area to its former condition. About 277 acres[8/] of bottom land hardwood habitat will be cleared for rights-of-way.

White-tailed deer have a highly diversified diet. Both browse and mast are important food items. The vegetative community that now exists is more productive deer habitat than that which will exist following construction. The clearing of 277 acres of hardwoods will be detrimental to the deerherd. However, browse and resting cover will be available on the berm and spoil.

Mourning doves and bobwhite quail are limited mainly to open land areas in the project area. The forested edges are utilized for nesting and escape cover. About 708 acres of narrow wooded channel banks and previously mentioned forested areas will be converted to open land. This conversion to open land will be beneficial to doves and quail. After a period of about 3 years, the open land condition will change to a brush-type habitat, causing its usefulness as feeding areas for doves and quail to diminish. Quail will utilize this brush-type habitat as escape cover.

Rabbit habitat along channels will be good after project construction. Grasses will be established on the berms and spoil. The only habitat loss computed for rabbits will result from the increase in channel size. This amounts to 143 acres.

Wild turkeys maintain high populations in large forested areas with interspersed openings. The clearing of 277 acres of hardwoods will further reduce the main habitat type for this bird. Some new food items will be available for turkeys on the berms and spoil after construction.

8/ The 277 acres is the disturbed channel rights-of-way; it excludes the existing channel acreage.

The impacts of this project on the "endangered" animal species and the "threatened" plant species that possibly occur will be minimal. The habitat for animals, however, is being further depleted by the cumulative impact of this project and many similar projects. One plant species, the silky Camellia, has been reported from Catahoula Parish where Channel M-1 is located. The chances of this plant occurring here are remote, however, since it will not thrive on the poorly-drained clay soils that exist along this channel.

Nongame animal populations will be altered. Open land species should increase and forest land species should decrease. The tabulation below shows the changes in habitat and estimated number of game animal changes as a result of construction. The first column lists the species of game that will be affected by project construction. The second column lists the type of habitat affected by project construction. The third column lists the acres of each habitat type affected. The fourth column lists the game animals lost or gained because of habitat loss or gain.

Changes in Habitat and Number of Game Animals
As a Result of Project Construction
East Franklin Watershed

Species	Habitat	Acres	Number of Animals
Deer	Forest Land	- 277	- 14
Squirrel	Forest Land	- 277	- 185
Dove a/	Open Land	+ 708	+ 118
Quail a/	Open Land	+ 708	+ 14
Rabbit	Forest Land & Open Land	- 143	- 14
Wild Turkey	Forest Land	- 277	- 3
Waterfowl b/	Forest Land	- 277	- 18

a/ Temporary Gain

b/ Migratory

Installation of a structure for water control (weir) in Channel M-20 will insure the preservation of present water levels on 147 acres of Type 7 wetlands and 23 acres of Type 5 wetlands. The remaining 4,170 acres of wetlands will not be affected by project action.

Archaeological, Historic, and Scientific

There are no properties listed in the National Register of Historical Places that will be affected by the installation of structural measures. This project will have no effect on any known archaeological or historical sites.

EFFECTS

Economic and Social

Agriculture, the economic base of the watershed, will be enhanced. The project will increase agricultural productivity which, in turn, will increase the net returns of processors and sellers of agricultural products as well as other goods. These increased returns will enhance the income of farm laborers and other agricultural workers.

The average annual gross sales of farm products are expected to increase by approximately 17 percent. In order to realize this increase, average annual production costs will increase by about 2 percent. This increase will consist primarily of additional costs incurred for harvesting larger volumes of crops as a result of project measures.

The higher level of protection, the reduced fixed cost of production, and the increased quality of products will give farmers an incentive to increase production inputs. They will buy better quality seed and will use more fertilizer and lime to attain higher future yields. Expenditures for fuel and other petroleum products used in harvesting and hauling the product to market will increase. This will stimulate economic activity within the watershed as well as the surrounding areas. More jobs will be created in the processing and service industries. The value of property will increase, which will provide for a higher tax base. Thus, the parish will have more funds to develop health, recreational, educational, and other needed facilities.

Installation of the project will create about 59 man-years of local labor for a 5-year period. The expenditure of $3,938,000 for the installation of land treatment measures will create an additional 170 man-years of labor throughout the 10-year period. Operation and maintenance will provide 150 man-years of local labor for the project life (50 years).

The project should slow the trend of decreasing number of farms and increasing size of farms. With the project, optimum-sized labor saving equipment will be used more efficiently on the farms. This and other factors will decrease production costs and increase yields, thus making farming more profitable. This will make farming more competitive for labor with other industries, thereby slowing the out-migration trend.

The project will directly benefit approximately 500 farmers, 2,000 farm family members, and farm employees. It is estimated 400 of these farmers will benefit from both structural measures and land treatment and the remaining 100 will benefit from accelerated land treatment. This will bring outside resources into the community and will provide an opportunity to use goods, services, and labor from the local area.

The average annual overall net farm income will increase about $1,200 per farm. With this increase and more stable income, the farmer may improve his house or buy a better automobile. He will be able to afford better dental and health care, more insurance, better clothes, and other amenities of life for his family.

The problems caused by flooded roads will be reduced. Schoolbuses will be able to travel their scheduled routes more regularly which will improve school attendance. The public will be better able to utilize roads for farming operations and marketing and for commuting to places of employment and business during wet periods. Nuisance damages to residences will be reduced.

Local traffic patterns will be interrupted temporarily during the replacement of bridges and culverts resulting in inconveniences to the people involved. Detour routes will be available such that no one will be deprived of access to their destination. Noise levels will increase at the construction sites. Increases in turbidity will occur downstream temporarily until the exposed areas are revegetated.

Local secondary benefits will accrue after the installation of project measures. The values added to the immediate products and services as a result of activities stemming from or induced by the project will enhance the overall local economy. The increased production of goods stemming from the project will place new demands on the processing, transporting, and marketing industries within the area. Processors, business establishments, and other individuals not directly benefited will profit from increased sales of their agricultural associated goods and products. Suppliers of the needed materials and services required to make possible the benefits expected from installation of the project will realize an increased net income. The increased production of goods and services induced by the project will stimulate local and regional economic activity.

PROJECT BENEFITS

The flood damage reduction benefits (table 5) will be $462,200 to crop and pasture, $40,500 to roads, and $54,300 to indirect sources. Project benefits (table 6) will be $1,237,000 annually, including $557,000 from flood damage reduction, $94,000 from more intensive land use, $387,400 from drainage, $158,300 from local secondary benefits, and $39,900 from redevelopment benefits.

Secondary benefits from a national viewpoint will accrue but these were not evaluated. There are other benefits which will accrue but no attempt was made to attach monetary value to them.

COMPARISON OF BENEFITS AND COSTS

Project benefits from structural measures are estimated to be $1,237,000. The average annual cost of structural measures (amortized installation cost plus operation and maintenance), is estimated to be $359,100, providing a benefit-cost ratio of 3.4 to 1. Total average annual benefits excluding secondary benefits are estimated to be $1,078,700, providing a benefit-cost ratio of 3 to 1.

PROJECT INSTALLATION

This project will be completed during a 10-year period. Forest land treatment will be installed during the first 5 years of the installation period, and the other land treatment over the full 10-year period. The structural measures will be installed during the first 5 years. The Sponsoring Local Organization understands its obligations and has agreed to carry out the work during this period.

The overall leadership necessary for the application of the land treatment measures will be provided by the Northeast and the Catahoula Soil and Water Conservation Districts. Landowners and operators will be encouraged to apply and maintain all needed measures on their land. Plans for the installation and maintenance of these measures will be outlined with each landowner, and the agreed-to items will be identified in a conservation plan which will be executed between the individual and the appropriate soil and water conservation district. A study of completed projects with purposes similar to this plan shows that land treatment planned during the project installation period can be accomplished.

Forest landowners will be encouraged to apply and maintain the recommended forestry measures on their lands. Technical assistance, now provided by the Louisiana Forestry Commission in cooperation with the U.S. Forest Service under the Cooperative Forest Management Program, will be increased to accelerate the installation of forestry measures. A forester will be assigned to the project to guide and assist the landowners in installing the planned forestry measures.

The Franklin Parish Police Jury and the Catahoula Parish Police Jury each will be responsible for carrying out works of improvement within the physical boundaries of the respective parishes. They will be responsible for the local share of the cost of construction, acquiring necessary land rights, obtaining modifications to all roads, bridges, culverts, utilities, and other existing items that are needed; and for advertising, awarding, and administering contracts. When a contract is wholly within a single parish, the organization within that parish will be responsible for its administration. Where both parishes are involved within a single contract, the two organizations will jointly be responsible for administering the contract. Both the Catahoula Parish Police Jury and the Franklin Parish Police Jury have the power of expropriation and have agreed to use these powers as necessary to obtain needed land, easements, and rights-of-way.

The channel work will progress in an upstream direction except when sections of streams thickly vegetated are left as buffers to absorb sediment from construction. When construction upstream is completed, the buffer zone downstream will be eliminated. Investigations indicate that in areas where this construction procedure will be used no downstream damages will be incurred. Care will be exercised to insure that the modification or reconstruction of bridges, culverts, or other existing facilities will not be a deterrent to the proper functioning of channel work and appurtenant structures.

FINANCING PROJECT INSTALLATION

Federal assistance will be provided under the authority of the Watershed Protection and Flood Prevention Act (Public Law 566, 83rd Congress; Stat. 666) as amended. This assistance is subject to appropriation of funds.

The cost of applying land treatment measures will be borne by the owners and operators of the land with aid from Federal and State programs. Technical assistance to the landowners and operators will be provided by the Soil Conservation Service and the U.S. Forest Service under going programs. Funds for the acceleration of technical assistance necessary to insure timely installation of land treatment measures and for soil surveys will be provided by Public Law 566.

The Louisiana Department of Public Works has agreed to provide funds for the local share of cost of structural measures contingent on the appropriation of monies for this purpose by the Louisiana Legislature. The Sponsors recognize, however, that these funds may not be available or that additional funds may be required. They will be responsible for obtaining additional financing as necessary through normal funding procedures such as taxes or bond issues.

The project Sponsors responsible for managing the finances of work in which the Soil Conservation Service has a financial interest will develop and maintain a financial management system. This system will contain provisions for maintaining accurate, current and complete disclosure of financial transactions, budgetary actions and provisions for audits. The system will be developed in accordance with and contain provisions set forth by Soil Conservation Service policy.

PROVISIONS FOR OPERATION AND MAINTENANCE

Operation and maintenance of all phases of the completed project will be the responsibility of the Sponsors. The Northeast and the Catahoula Soil and Water Conservation Districts, with help from available sources and working with individual landowners and operators, will have the responsibility for maintaining land treatment measures. The Louisiana Forestry Commission, in cooperation with the U.S. Forest Service, will furnish the technical assistance necessary for maintaining the forest land treatment measures under the going Cooperative Forest Management Program. The Federal-State Cooperative Fire Control Program will continue to furnish fire protection for the watershed area. The Northeast and the Catahoula Soil and Water Conservation Districts, with technical assistance from the Soil Conservation Service, will assist and encourage landowners to install and maintain land treatment measures. The objectives will be to maintain adequate drains, ground cover, and other practices which will protect and conserve soil and water resources.

Operation and maintenance of all phases of the completed structural measures will be the responsibility of the Catahoula Parish Police Jury and the Franklin Parish Police Jury. In addition to maintaining the 186 miles of channels with appurtenant structures proposed in the plan, they will continue to maintain the present flow conditions of those channels that are now adequate (36 miles), as indicated on the Project Map, Figure 7. There are 6 miles of channels and appurtenant structures in Catahoula Parish, 204 miles in Franklin Parish, and 12 miles on the Catahoula-Franklin Parish boundary. The methodical operation and maintenance of structural measures will insure proper functioning of these measures and realization of benefits.

A 4-mill tax was passed in March, 1968 for the purpose of maintaining project channels. Should these funds prove inadequate, the Sponsors have agreed to provide additional financing by an increase in revenue from normal taxing procedures.

Channel maintenance includes periodic cleanouts necessary to restore channels to their planned capacities, patching of eroded areas or washouts on channel banks, control of aquatic weeds, and repair or replacement of side inlets and other structures. Maintenance of structures for water control and grade stabilization structures include repairing rills around headwalls or wingwalls, replacing rock riprap as needed, maintaining or replacing vegetation on fills, repairing or replacing worn or broken parts, replacing short-life parts, and all other activities essential to the safety and functioning of the structure. Improvement of the aesthetics of the channel and structure sites shall be considered an important feature of the maintenance program.

Annual operation and maintenance expenses are $20,200 for periodic removal of sediment from channels, $91,900 for vegetative control, and

$3,600 for repair and replacement of pipe structures, for a total annual cost of $115,700. The annual costs of operation and maintenance for Catahoula Parish is $8,400 and for Franklin Parish is $107,300.

Existing public roads, farm roads, turn rows, trails, open areas, and other existing facilities will be used for maintenance equipment to reach the channels. Sufficient access is available to properly maintain all channels. The channels will be kept clear of excessive vegetation by mowing, hand labor, and use of approved herbicides. Herbicides such as ammonium sulfamate, bromacil, and others registered with the Environmental Protection Agency (EPA) and approved by the United States Department of Agriculture (USDA) will be applied in a manner consistent with their labeling. Copper sulfate and cutrine will be used to control algae before excessive "blooms" develop in areas upstream from the 28 structures for water control (weirs). Pesticides presently approved will not preclude the use of other EPA registered and USDA approved pesticides developed during the life of the project. Herbicides will be used in areas where mowing and hand labor are not practical. Spraying will be accomplished in the summer months when the ephemeral channels and the intermittent channels have no water. Spraying during these months will lower the probability of runoff carrying herbicides into other areas. Eroded banks, side inlets, and other appurtenances will be repaired when in need. Sediment accumulation (mud bars) will be removed periodically by mechanical means.

Trees remaining on channel banks not disturbed during construction will be maintained. Trees left in channel rights-of-way for landscape purposes and those planted on spoil banks in the forest areas will not be destroyed by maintenance methods. Two mechanical cleanouts are anticipated during the life of the project. The amount of sediment to be removed each time will be small enough to be placed and smoothed on the berm.

Provisions will be made for representatives of the Soil Conservation Service, the Louisiana Department of Public Works, and the Sponsors to have free access to all portions of the works of improvement at any reasonable time for the purpose of inspection, repair, and maintenance. The Sponsors, together with representatives of the Soil Conservation Service, will make a joint inspection annually, after severe storms, and after the occurrence of any other unusual conditions that might adversely affect the structural measures.

These joint inspections will continue for 3 years following installation of the structural measures. Inspections after the third year will be made by the Sponsors. They will prepare an annual report and send a copy to the Soil Conservation Service. Items of inspection will include, but will not be limited to, (1) conditions of vegetative cover and growth, (2) need for removal of sediment bars and debris accumulations, (3) brush control in channels, and (4) general conditions.

PROVISIONS

The Sponsoring Local Organization fully understands its obligations for operation and maintenance and will execute a specific operation and maintenance agreement with the Soil Conservation Service prior to the execution of the project agreement for the installation of works of improvement.

TABLE 1 - ESTIMATED PROJECT INSTALLATION COST

East Franklin Watershed, Louisiana

Installation Cost Item	Unit	Number Non-Federal Land	Estimated Cost (Dollars)1/ P.L. 566 Funds SCS3/	P.L. 566 Funds FS3/	P.L. 566 Funds Total	Other SCS3/	Other FS3/	Other Total	TOTAL
LAND TREATMENT									
Land Areas2/									
Cropland	Acres	72,400				3,079,700		3,079,700	3,079,700
Pastureland	To Be	16,600				805,800		805,800	805,800
Forest Land	Treated	1,200					17,500	17,500	17,500
Other Land		3,100				52,500		52,500	52,500
Individual Practices									
Fire Control							17,700	17,700	17,700
Technical Assistance			1,017,200	10,000	1,027,200	172,500	6,400	178,900	1,206,100
TOTAL LAND TREATMENT			1,017,200	10,000	1,027,200	4,110,500	41,600	4,152,100	5,179,300
STRUCTURAL MEASURES									
Construction Work									
Channel Work4/									
N	Miles	47 5/	298,700		298,700	88,200		88,200	386,900
M	Miles	169 5/	1,238,600		1,238,600	365,800		365,800	1,604,400
O	Miles	6	51,650		51,650	15,250		15,250	66,900
Subtotal-Construction			1,588,950		1,588,950	469,250		469,250	2,058,200
Engineering Services			143,600		143,600				143,600
Relocation Payments									
Project Administration									
Construction Inspection			205,900		205,900				205,900
Other			189,780		189,780	22,620		22,620	212,400
Relocation Assistance Advisory Services									
Subtotal-Administration			395,680		395,680	22,620		22,620	418,300
Other Costs									
Land Rights6/						1,424,900		1,424,900	1,424,900
Subtotal-Other						1,424,900		1,424,900	1,424,900
TOTAL STRUCTURAL MEASURES			2,128,230		2,128,230	1,916,770		1,916,770	4,045,000
TOTAL PROJECT			3,145,430	10,000	3,155,430	6,027,270	41,600	6,068,870	9,224,300

1/ Price base 1974.
2/ Includes only areas estimated to be adequately treated during the project installation period. Treatment will be accelerated throughout the watershed, and dollar amounts apply to total land areas, not just to adequately treated areas.
3/ Federal agency responsible for assisting in installation of works of improvement.
4/ Type of channel prior to project: (N) Unmodified well-defined natural channel or stream (M) Manmade or previously modified channel (O) None or practically no defined channel
5/ There are 36 miles of adequate project channels that do not incur construction costs.
6/ Land rights costs are included for 36 miles of adequate channels because maintenance is required.

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TABLE 1A - STATUS OF WATERSHED WORKS OF IMPROVEMENT

East Franklin Watershed, Louisiana

	Unit	Applied To Date	Total Cost[1] (Dollars)
Land Treatment			
Chiseling & Subsoiling	Ac.	6,600	34,200
Conservation Cropping System	Ac.	12,600	49,000
Contour Farming	Ac.	200	800
Crop Residue Use	Ac.	24,700	64,000
Drainage Field Ditches	Ft.	422,500	54,800
Drainage Land Grading	Ac.	4,100	462,200
Drainage Mains & Laterals	Ft.	383,600	74,500
Grade Stabilization Structures	No.	4	2,100
Irrigation Field Ditches	Ft.	54,600	21,900
Irrigation Land Leveling	Ac.	100	11,300
Irrigation System	No.	24	108,900
Land Smoothing	Ac.	300	3,900
Pasture & Hayland Management	Ac.	3,700	19,200
Pasture & Hayland Planting	Ac.	10,100	392,700
Structures For Water Control	No.	200	38,900
Improvement Cut	Ac.	10,700	13,900
Cooperative Forest Fire Control	Ac.	36,900	28,700
TOTAL			1,381,000

1/ Price base 1974.

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TABLE 2 - ESTIMATED STRUCTURAL COST DISTRIBUTION

East Franklin Watershed, Louisiana

(Dollars)[1/]

Item	Installation Cost - P.L. 566 Funds			Installation Cost - Other Funds			Total[4/]
	Construction	Engineering	Total Public Law 566	Construction	Land Rights	Total Other	Installation Cost
CHANNEL WORK[2/]							
Evaluation Unit I							
N	194,150	17,600	211,750	57,350	159,100	216,450	428,200
M	331,025	30,000	361,025	97,775	308,700	406,475	767,500
O	2,325	200	2,525	675	1,400	2,075	4,600
Subtotal	527,500	47,800	575,300	155,800	469,200	625,000	1,200,300
Evaluation Unit II							
N	9,575	800	10,375	2,825	12,200	15,025	25,400
M	673,275	61,000	734,275	198,825	554,100	752,925	1,487,200
O	1,850	100	1,950	550	1,800	2,350	4,300
Subtotal	684,700	61,900	746,600	202,200	568,100	770,300	1,516,900
Evaluation Unit III							
N	38,925	3,500	42,425	11,475	97,600	109,075	151,500
M	119,425	10,800	130,225	35,275	100,900	136,175	266,400
O	3,625	300	3,925	1,075	1,900	2,975	6,900
Subtotal	161,975	14,600	176,575	47,825	200,400	248,225	424,800
Evaluation Unit IV							
N	56,050	5,000	61,050	16,550	55,000	71,550	132,600
M	114,875	10,300	125,175	33,925	106,800	140,725	265,900
O	43,850	4,000	47,850	12,950	25,400	38,350	86,200
Subtotal	214,775	19,300	234,075	63,425	187,200	250,625	484,700
TOTAL	1,588,950	143,600	1,732,550	469,250	1,424,900	1,894,150	3,626,700
Project Administration	xxx	xxx	395,680	xxx	xxx	22,620	418,300
GRAND TOTAL	1,588,950	143,600	2,128,230	469,250	1,424,900[3/]	1,916,770	4,045,000

1/ Price base 1974.

2/ Type of channel before the project: (N) - an unmodified, well defined natural channel or stream; (M) - manmade ditch or previously modified channel; (O) - none or practically no defined channel.

3/ Includes $187,600 for value of land, legal fees and surveys; $695,100 for replacement or modification of bridges and culverts; and $516,200 for modification of pipelines, utility lines and miscellaneous facilities.

4/ The cost of this work includes channel work (excavation and clearing), appurtenant grade stabilization structures, structures for water control and vegetative plantings.

May 1974

TABLE 2A - COST ALLOCATION AND COST SHARING SUMMARY

East Franklin Watershed, Louisiana

(Dollars)1/

Item	Cost Allocation			Cost Sharing					
				Public Law 566			Other		
	Flood Prevention	Drainage	Total	Flood Prevention	Drainage	Total	Flood Prevention	Drainage	Total
MULTIPLE PURPOSE Channel Work With Appurtenant Structures	1,971,500	1,655,200	3,626,700	1,197,800	534,750	1,732,550	773,700	1,120,450	1,894,150
TOTAL	1,971,500	1,655,200	3,626,700	1,197,800	534,750	1,732,550	773,700	1,120,450	1,894,150

1/ Price base 1974.

May 1974

TABLE 3 - STRUCTURE DATA

CHANNELS

East Franklin Watershed, Louisiana

Channel	Station	Drainage Area	Capacity Req'd	Capacity Des.	Water Surf. Elev.	Hydr. Grad.	Channel Dimensions: Bottom Width	Bottom Grade	Flow Depth	Side Slope	"n" Value Aged	"n" Value As Built	Velocities Aged	Velocities As Built	Excavation	Inventory of Chan. Work 1/ Type of Work	Type Chan. Before Proj.	Flow Cond. Before Proj.
		sq mi	cfs	cfs		ft/ft	ft	%	ft				fps	fps	cu yd			
M-1	1240+80	0.66	35	46	72.3	0.00025	14.0	0.04	3.0	1.0:1	0.045	0.022	0.90	1.84		II	N	E
	1000+00	4.21	158	167	66.2	0.00025	14.0	0.04	5.9	1.0:1	0.040	0.022	1.43	2.59		II	N	E
	969+18	4.48	166	169	65.5	0.00025	14.0	0.03	5.9	1.0:1	0.040	0.022	1.44	2.62		II	N	E
	700+00	8.73	299	284	58.7	0.00025	14.0	0.03	6.7	1.5:1	0.035	0.022	1.76	2.80		II	N	E
	574+73	10.48	278	448	55.6	0.00025	A= 256.25		P= 61.00		0.035	0.035	1.75	1.75		IV	M 2/	E
	570+00	17.75	556	636	55.5	0.00025	22.0	0.04	7.9	1.5:1	0.030	0.022	2.38	3.25		II	M 2/	E
	570+00	20.54	622	625	54.0	0.00010	40.0	0.01	7.6	1.5:1	0.030	0.022	1.60	2.18		II	M	I
	481+48	21.22	631	639	53.2	0.00010	40.0	0.01	7.7	1.5:1	0.030	0.022	1.61	2.20		II	M	I
	250+00	23.90	700	697	50.8	0.00010	40.0	0.01	8.1	1.5:1	0.030	0.022	1.65	2.25	352678	II	N	I
	180+00	24.89	725	762	50.1	0.00010	A= 876.00		P= 132.00		0.030	0.030	1.87	0.87		IV	N	I
	140+00	28.06	766	911	49.1	0.00010	A=1115.16		P= 186.03		0.060	0.060	0.82	0.82		VI	N	I
	0+00	34.04	910	1371	48.3	0.00010	A=1364.00		P= 167.00		0.060	0.060	1.01	1.01		VI	N	S
L-1A	194+00	0.14	9	14	70.9	0.00100	4.0	0.12	2.0	1.0:1	0.045	0.022	1.20	2.45		II	M 2/	E
	156+00	0.38	22	24	66.7	0.00100	4.0	0.12	2.6	1.0:1	0.045	0.022	1.37	2.80		II	M 2/	E
	113+00	0.79	41	42	65.2	0.00025	8.0	0.07	3.8	1.0:1	0.045	0.022	0.93	1.90		II	M 2/	E
	80+00	1.64	75	74	64.4	0.00025	12.0	0.03	4.0	1.0:1	0.040	0.022	1.15	2.09	9694	II	M 2/	E
	0+00	2.03	90	131	56.4	0.00100	A= 107.40		P= 55.00		0.060	0.060	1.22	1.22		VI	M 2/	E
L-1B	78+00	0.86	39	40	58.2	0.00080	6.0	0.10	3.1	1.0:1	0.045	0.022	1.43	2.86		II	M 2/	E
	37+00	1.78	72	71	54.9	0.00080	8.0	0.10	3.7	1.0:1	0.045	0.022	1.65	3.37		II	M 2/	E
	0+00	2.78	109	110	54.0	0.00025	12.0	0.06	5.0	1.0:1	0.040	0.022	1.29	4.33	8284	II	M 2/	E
L-1C	172+85	1.21	58	57	73.1	0.00010	10.0	0.03	4.9	1.0:1	0.040	0.022	0.78	1.42		II	M 2/	E
	146+32	1.34	64	66	72.8	0.00010	10.0	0.03	5.3	1.0:1	0.040	0.022	0.81	1.47		II	M 2/	E
	140+00	2.10	93	98	72.8	0.00010	14.0	0.03	5.6	1.0:1	0.040	0.022	0.89	1.62	4783	II	M 2/	E
	80+00	2.46	112	160	67.1	0.00095	A= 97.40		P= 31.00		0.060	0.060	1.64	1.64		VI	M 2/	E
	72+63	2.78	129	150	65.9	0.00140	A= 75.14		P= 23.70		0.060	0.060	1.99	1.99		VI	M 2/	E
	9+00	4.36	191	201	57.0	0.00140	A= 75.15		P= 23.70		0.045	0.045	2.67	2.67		IV	M 2/	E
	0+00	7.27	277	328	55.7	0.00140	A= 163.30		P= 51.00		0.060	0.060	2.01	2.01		VI	M 2/	E
L-1C1	202+00	0.14	10	11	71.1	0.00015	8.0	0.03	2.1	1.0:1	0.045	0.022	0.53	1.08		II	M 2/	E
	71+95	1.40	66	67	69.0	0.00015	9.0	0.03	5.0	1.0:1	0.040	0.022	0.95	1.73		II	M 2/	E
	39+08	2.37	103	104	68.5	0.00015	12.0	0.04	5.6	1.0:1	0.040	0.022	1.06	1.93	21779	II	M 2/	E
	0+00	2.79	118	163	56.8	0.00290	A= 58.20		P= 21.70		0.055	0.055	2.81	2.81		VI	M 2/	E
L-1C1A	43+55	0.18	11	11	70.4	0.00050	4.0	0.10	2.1	1.0:1	0.045	0.022	0.88	1.80		II	M 2/	E
	30+00	0.32	24	25	69.5	0.00050	6.0	0.34	2.7	1.0:1	0.045	0.022	1.06	2.17		II	M 2/	E
	17+94	0.40	32	33	69.4	0.00010	12.0	0.05	3.5	1.0:1	0.045	0.022	0.60	1.22		II	M 2/	E
	0+00	0.48	36	43	69.0	0.00010	A= 59.00		P= 21.30		0.040	0.040	0.73	0.73	1835	IV	M 2/	E
L-1E	73+88	0.16	11	10	74.5	0.00020	4.0	0.26	2.6	1.0:1	0.045	0.022	0.61	1.25		II	M (1959)	E
	28+00	0.36	21	21	73.2	0.00020	4.0	0.05	3.7	1.0:1	0.045	0.022	0.73	1.49		II	M (1959)	E
	10+75	0.60	33	33	72.4	0.00020	6.0	0.07	4.0	1.0:1	0.045	0.022	0.82	1.68	6294	II	M (1959)	E
L-1F	157+07	0.15	10	15	70.4	0.00050	6.0	0.09	2.0	1.0:1	0.045	0.022	0.91	1.86		II	M 2/	E
	119+42	0.61	33	34	68.4	0.00050	6.0	0.09	3.2	1.0:1	0.045	0.022	1.16	2.37	804	II	M 2/	E
	113+68	0.61	33	37	68.0	0.00050	A= 34.75		P= 19.00		0.045	0.045	1.07	1.07		IV	M 2/	E
	106+00	1.32	71	152	67.6	0.00050	A= 126.70		P= 38.00		0.060	0.060	1.20	1.20		VI	M 2/	E
	36+00	3.66	150	944	53.2	0.00200	A= 361.55		P= 100.00		0.060	0.060	2.61	2.61		VI	M 2/	E
L-1F1	98+50	0.11	8	12	69.7	0.00065	4.0	0.11	2.0	1.0:1	0.045	0.022	0.97	1.98		II	M 2/	E
	60+00	0.29	17	17	67.0	0.00065	4.0	0.11	2.4	1.0:1	0.045	0.022	1.10	2.25		II	M 2/	E
	23+00	0.53	29	33	66.3	0.00010	6.0	0.05	4.5	1.0:1	0.040	0.022	0.69	1.25	5325	II	M 2/	E
	0+00	0.53	33	33	66.0	0.00010	Adequate Due To Overbank Flow									VI	M 2/	E
L-1F2	98+79	0.03	3	9	71.0	0.00040	4.0	0.07	2.0	1.0:1	0.045	0.022	0.76	1.55		II	M 2/	E
	60+30	0.26	17	17	69.2	0.00040	4.0	0.07	2.8	1.0:1	0.045	0.022	0.90	1.84		II	M 2/	E
	0+00	0.71	37	37	68.0	0.00010	6.0	0.04	4.8	1.0:1	0.040	0.022	0.71	1.29	5603	II	M 2/	E
M-2	541+12	0.21	14	14	67.9	0.00010	4.0	0.09	3.6	1.0:1	0.045	0.022	0.51	1.04		II	M 2/	E
	516+90	0.35	21	42	65.5	0.00090	4.0	0.09	3.6	1.0:1	0.045	0.022	1.54	3.15		II	M 2/	E
	481+30	0.87	45	65	62.3	0.00090	A= 50.15		P= 22.00		0.060	0.060	1.29	1.29		VI	M 2/	E
	419+20	4.29	167	164	60.7	0.00025	14.0	0.04	5.8	1.0:1	0.040	0.022	1.43	2.58		II	M 2/	E
	314+00	8.67	301	354	57.7	0.00050	14.0	0.03	6.3	1.5:1	0.035	0.022	2.40	3.82	44416	II	M 2/	E
	200+00	16.68	520	545	53.0	0.00050	A= 201.70		P= 42.00		0.035	0.035	2.70	2.70		IV	M	I
	90+00	21.78	647	647	52.8	0.00001	Adequate Due To Overbank Flow									VI	M	I
	0+00	25.95	750	750	52.7	0.00001	Adequate Due To Overbank Flow									VI	M	S
L-2A	206+00	1.34	58	60	59.8	0.00025	7.0	0.08	4.6	1.0:1	0.040	0.022	1.13	2.05		II	M 2/	E
	97+00	2.68	106	107	57.0	0.00025	7.0	0.08	6.2	1.0:1	0.040	0.022	1.31	2.38	24243	II	M 2/	E
	0+00	4.10	152	325	54.6	0.00025	A= 416.10		P= 146.00		0.060	0.060	0.78	0.78		VI	M 2/	E

1/ See Attached "Coding System for Inventory of Channel Work"
2/ Available records show major construction in period from 1946 to 1953 by the Louisiana Department of Public Works.

(continued)
Table 3 - Structure Data Channels
East Franklin Watershed, Louisiana

Channel	Station	Drainage Area	Capacity Req'd	Capacity Des.	Water Surf. Elev.	Hydr. Grad.	Channel Dimensions: Bottom Width	Channel Dimensions: Bottom Grade	Channel Dimensions: Flow Depth	Channel Dimensions: Side Slope	"n" Value: Aged	"n" Value: As Built	Velocities: Aged	Velocities: As Built	Excavation	Inventory of Chan. Work 1/: Type of Work	Inventory of Chan. Work 1/: Type Chan. Before Proj.	Inventory of Chan. Work 1/: Flow Cond. Before Proj.
		sq mi	cfs	cfs		ft/ft	ft	%	ft				fps	fps	cu yd			
L-2A1	82+39	0.16	11	12	60.8	0.00075	4.0	0.12	2.0	1.0:1	0.045	0.022	1.04	2.13		II	M2/	E
	45+00	0.45	26	27	57.5	0.00075	4.0	0.12	3.0	1.0:1	0.045	0.022	1.28	2.62		II	M2/	E
	4+50	0.92	47	46	57.0	0.00010	6.0	0.07	5.4	1.0:1	0.040	0.022	0.75	1.36	7084	II	M2/	E
	0+00	0.92	47	100	57.0	0.00010	A= 242.80		P= 114.00		0.060	0.060	0.41	0.41		VI	M2/	E
L-2B	225+00	0.26	17	17	62.8	0.00020	6.0	0.02	2.8	1.0:1	0.045	0.022	0.68	1.39		II	M2/	E
	195+70	0.35	21	21	62.0	0.00020	6.0	0.02	3.2	1.0:1	0.045	0.022	0.73	1.49		II	M2/	E
	64+92	2.25	99	98	59.2	0.00020	12.0	0.03	5.0	1.0:1	0.040	0.022	1.15	2.09	25991	II	M2/	E
	0+00	3.11	129	136	57.9	0.00020	A= 150.00		P= 48.00		0.050	0.050	0.90	0.90		VI	M2/	E
L-2B1 (Alt.)	28+00	0.07	5	8	62.8	0.00030	4.0	0.10	2.0	1.0:1	0.045	0.022	0.66	1.35		II	O	E
	2+50	0.40	24	24	62.1	0.00030	4.0	0.10	3.6	1.0:1	0.045	0.022	0.89	1.82		II	O	E
	0+00	0.40	24	24	62.0	0.00030	4.0	0.10	3.6	1.0:1	0.045	0.022	0.89	1.82	4395	II	N	E
L-2C	270+96	0.22	14	15	69.4	0.00010	8.0	0.04	2.8	1.0:1	0.045	0.022	0.51	1.04		II	M2/	E
	200+37	0.86	44	44	68.7	0.00010	8.0	0.04	4.7	1.0:1	0.040	0.022	0.74	1.35		II	M2/	E
	110+00	4.28	166	168	67.8	0.00010	14.0	0.03	6.5	1.5:1	0.035	0.022	1.09	1.73	63176	II	M2/	E
	0+00	5.60	240	253	60.1	0.00070	A= 167.40		P= 38.00		0.070	0.070	1.51	1.51		VI	M2/	E
L-2C1	85+63	0.03	3	14	68.2	0.00040	4.0	0.05	2.5	1.0:1	0.045	0.022	0.85	1.74		II	M2/	E
	39+25	0.31	19	20	66.1	0.00040	4.0	0.05	3.0	1.0:1	0.045	0.022	0.93	1.90		II	M2/	E
	0+00	1.29	62	65	64.3	0.00040	6.0	0.06	4.5	1.0:1	0.040	0.022	1.38	2.51	7034	II	M2/	E
L-2C2	11+00	0.94	49	51	69.1	0.00040	6.0	0.04	4.2	1.0:1	0.045	0.022	1.18	2.41		II	M2/	E
	0+00	1.02	51	51	68.7	0.00040	6.0	0.04	4.2	1.0:1	0.045	0.022	1.18	2.41	2007	II	M2/	E
L-2C2 (Alt.)	63+62	0.25	16	19	71.8	0.00040	6.0	0.06	2.5	1.0:1	0.045	0.022	0.91	1.86		II	M2/	E
	0+00	0.70	37	38	69.1	0.00040	6.0	0.06	3.6	1.0:1	0.045	0.022	1.10	2.25	9537	II	M2/	E
L-2D	130+00	0.34	21	21	64.2	0.00010	10.0	0.06	3.0	1.0:1	0.045	0.022	0.54	1.10		II	M2/	E
	88+70	0.93	47	47	63.6	0.00010	10.0	0.06	4.4	1.0:1	0.040	0.022	0.74	1.35		II	M2/	E
	8+00	1.70	78	85	60.9	0.00030	10.0	0.03	4.5	1.0:1	0.040	0.022	1.30	2.36	16871	II	M2/	E
	0+00	2.01	90	167	60.7	0.00030	A= 134.95		P= 36.00		0.050	0.050	1.24	1.24		VI	M2/	E
L-2D1	29+68	0.10	7	7	62.5	0.00010	4.0	0.05	2.5	1.0:1	0.045	0.022	0.43	0.88		II	M2/	E
	0+00	0.20	13	13	62.0	0.00010	4.0	0.05	3.4	1.0:1	0.045	0.022	0.50	1.02	1207	II	M2/	E
L-2E	35+00	0.21	14	15	68.6	0.00050	6.0	0.08	2.0	1.0:1	0.045	0.022	0.91	1.86		II	M (1959)	E
	6+25	0.41	24	25	67.0	0.00050	6.0	0.08	2.7	1.0:1	0.045	0.022	1.06	2.17	2956	II	M (1959)	E
	0+00	0.41	24	25	66.4	0.00050	A= 23.49		P= 13.64		0.045	0.045	1.06	1.06		VI	M (1959)	E
L-2F	31+50	0.21	14	14	63.0	0.00040	4.0	0.06	2.5	1.0:1	0.045	0.022	0.85	1.74		II	M2/	E
	0+00	0.37	22	22	61.7	0.00040	4.0	0.06	3.2	1.0:1	0.045	0.022	0.97	1.98	1518	II	M2/	E
L-2G	81+69	0.16	11	14	71.6	0.00090	4.0	0.10	2.0	1.0:1	0.045	0.022	1.14	2.33		II	M2/	E
	65+00	0.27	17	18	69.9	0.00090	4.0	0.10	2.3	1.0:1	0.045	0.022	1.23	2.52		II	M2/	E
	10+00	0.90	46	47	69.1	0.00010	8.0	0.04	4.9	1.0:1	0.040	0.022	0.75	1.36	10000	II	M2/	E
	0+00	0.94	47	44	69.0	0.00010	A= 99.60		P= 42.00		0.060	0.060	0.44	0.44		VI	M2/	E
L-2H	84+88	0.03	3	14	65.7	0.00090	4.0	0.12	2.0	1.0:1	0.045	0.022	1.14	2.33		II	M2/	E
	55+00	0.26	17	18	63.0	0.00090	4.0	0.12	2.3	1.0:1	0.045	0.022	1.23	2.52		II	M2/	E
	0+00	0.90	45	44	62.4	0.00010	8.0	0.02	4.7	1.0:1	0.040	0.022	0.74	1.35	7879	II	M2/	E
M-3	1130+50	0.28	18	18	88.9	0.00035	6.0	0.08	2.5	1.0:1	0.045	0.022	0.86	1.75		II	M2/	E
	1030+80	1.03	51	52	85.3	0.00035	6.0	0.05	4.4	1.0:1	0.045	0.022	1.13	2.31		II	M2/	E
	829+00	2.35	102	100	81.0	0.00020	10.0	0.03	5.5	1.0:1	0.040	0.022	1.17	2.13		II	M2/	E
	720+00	11.52	386	385	79.4	0.00015	30.0	0.02	6.5	1.5:1	0.035	0.022	1.49	2.37		II	M2/	E
	570+40	16.38	513	510	74.1	0.00035	30.0	0.03	6.0	1.5:1	0.035	0.022	2.18	3.47		II	M2/	E
	263+00	37.20	1020	1027	71.1	0.00010	50.0	0.01	8.1	1.5:1	0.025	0.022	2.04	2.33	582000	II	M2/	I
	200+00	47.88	1253	1272	70.5	0.00010	A= 550.80		P= 72.00		0.025	0.025	2.31	2.31		VI	M2/	I
	65+00	51.36	1320	2022	63.8	0.00050	A= 498.20		P= 71.00		0.030	0.030	4.06	4.06		VI	M2/	I
	43+00	53.65	1385	1541	62.7	0.00050	A= 785.75		P= 155.00		0.050	0.050	1.96	1.96		IV	M2/	I
	0+00	55.11	1410	1541	60.5	0.00050	A= 785.75		P= 155.00		0.050	0.050	1.96	1.96		VI	M2/	I
L-3A	91+00																	
	0+00	1.07	ESTIMATED												8000	II	M2/	E
L-3A1	18+00																	
	0+00	0.29	ESTIMATED												1600	II	M (1961)	E
L-3B	196+93	0.32	19	18	75.2	0.00015	10.0	0.04	2.4	1.0:1	0.045	0.022	0.59	1.21		II	M	E
	109+60	1.09	54	55	73.9	0.00015	10.0	0.04	4.3	1.0:1	0.040	0.022	0.89	1.62		II	M	E
	91+30	2.39	104	115	73.6	0.00015	14.0	0.02	5.5	1.0:1	0.040	0.022	1.07	1.95		II	M	E
	0+00	9.80	335	396	72.7	0.00010	30.0	0.01	6.8	1.5:1	0.030	0.022	1.45	1.97	80308	II	M	E

1/ See Attached "Coding System for Inventory of Channel Work"
2/ Available records show major construction in period from 1946 to 1953 by the Louisiana Department of Public Works.

(continued)
Table 3 - Structure Data Channels
East Franklin Watershed, Louisiana

Channel	Station	Drainage Area	Capacity Req'd	Capacity Des.	Water Surf. Elev.	Hydr. Grad.	Channel Dimensions Bottom Width	Bottom Grade	Flow Depth	Side Slope	"n" Value Aged	"n" Value As Built	Velocities Aged	Velocities As Built	Excavation	Inventory of Chan. Work 1/ Type of Work	Type of Chan. Before Proj.	Flow Cond. Before Proj.
		sq mi	cfs	cfs		ft/ft	ft	%	ft				fps	fps	cu yd			
L-3B1	78+00																	
	0+00	1.04		ESTIMATED											6900	II	M(1959)	E
L-3B1A	35+00																	
	0+00	0.35													3000	II	O	E
L-3B2	175+25	0.93	48	49	76.8	0.00025	10.0	0.03	3.7	1.0:1	0.045	0.022	0.96	1.97		II	N	E
	106+80	1.24	59	57	74.9	0.00025	10.0	0.02	3.8	1.0:1	0.040	0.022	1.09	1.98		II	N	E
	93+50	1.36	65	66	74.5	0.00010	14.0	0.03	4.5	1.0:1	0.040	0.022	0.79	1.44		II	N	E
	86+00	1.89	85	93	74.5	0.00010	20.0	0.01	4.5	1.0:1	0.040	0.022	0.84	1.53		II	N	E
	0+00	5.76	216	219	73.6	0.00010	30.0	0.02	5.5	1.0:1	0.035	0.022	1.12	1.78	100914	II	M2/	E
L-3B2A	55+00																	
	0+00	0.53		ESTIMATED											4800	II	M2/	E
L-3B2B	100+00																	
	0+00	3.27		ESTIMATED											8800	II	M2/	E
L-3B2B1	40+00																	
	0+00	1.56		ESTIMATED											3500	II	M2/	E
L-3B3	125+00																	
	0+00	1.27		ESTIMATED											11000	II	M2/	E
L-3C	40+00																	
	0+00	1.22		ESTIMATED											3500	II	M(1961)	E
L-3D	312+00																	
	0+00	6.77		ESTIMATED											27500	II	M2/	E
L-3D1	109+00																	
	0+00	2.18		ESTIMATED											9600	II	M2/	E
L-3E	287+60	0.07	6	10	79.0	0.00015	8.0	0.06	2.0	1.0:1	0.045	0.022	0.52	1.07		II	M2/	E
	170+00	1.03	51	50	77.1	0.00015	8.0	0.02	4.5	1.0:1	0.040	0.022	0.88	1.60		II	M2/	E
	111+75	1.84	83	82	76.3	0.00010	12.0	0.02	5.5	1.0:1	0.040	0.022	0.85	1.55		II	M2/	E
	0+00	4.20	166	166	75.0	0.00010	14.0	0.02	7.0	1.0:1	0.035	0.022	1.13	1.80	46221	II	M2/	E
L-3E1	55+00																	
	0+00	0.59		ESTIMATED											4800	II	M2/	E
L-3F	261+35	1.09	53	56	79.1	0.00020	10.0	0.04	4.0	1.0:1	0.040	0.022	1.00	1.82		II	M2/	E
	170+00	2.03	90	90	77.1	0.00020	10.0	0.02	5.2	1.0:1	0.040	0.022	1.14	2.07		II	M2/	E
	68+00	4.77	184	208	75.0	0.00020	18.0	0.03	5.8	1.0:1	0.035	0.022	1.51	2.40		II	M2/	E
	0+00	5.46	206	205	74.2	0.00010	22.0	0.02	6.3	1.0:1	0.035	0.022	1.15	1.83	91162	II	M2/	E
L-3F1	99+00																	
	0+00	1.60		ESTIMATED											8700	II	M2/	E
L-3G	134+30	0.62	34	34	82.0	0.00020	4.0	0.01	4.7	1.0:1	0.045	0.022	0.83	1.70		II	M	E
	120+00	0.69	37	37	82.0	0.00020	4.0	0.01	4.9	1.0:1	0.045	0.022	0.85	1.74		II	M	E
	12+00	1.83	83	81	79.8	0.00020	8.0	0.02	5.4	1.0:1	0.040	0.022	1.12	2.04		II	M	E
	0+00	3.83	153	161	79.6	0.00020	14.0	0.02	6.1	1.0:1	0.040	0.022	1.31	2.38	21068	II	M	E
L-3G1	109+00																	
	0+00	1.86		ESTIMATED											9600	II	M(1961)	E
L-3G1A	55+00																	
	0+00	0.44		ESTIMATED											4800	II	M2/	E
L-3G2	45+00																	
	0+00	0.29		ESTIMATED											3900	II	M2/	E
L-3H	283+55	0.28	17	17	85.0	0.00015	9.0	0.06	2.5	1.0:1	0.045	0.022	0.60	1.23		II	M2/	E
	187+50	0.97	49	49	83.3	0.00015	10.0	0.02	4.0	1.0:1	0.040	0.022	0.87	1.58		II	M2/	E
	100+00	2.48	106	106	82.0	0.00015	16.0	0.02	4.9	1.0:1	0.040	0.022	1.04	1.89		II	M2/	E
	46+00	3.55	145	153	81.5	0.00010	20.0	0.01	5.6	1.0:1	0.035	0.022	1.07	1.70		II	M2/	E
	0+00	7.92	282	297	81.0	0.00010	30.0	0.01	6.6	1.0:1	0.035	0.022	1.23	1.96	64800	II	M2/	E
L-3H1	25+00																	
	0+00	0.46		ESTIMATED											2200	II	M2/	E

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2/ Available records show major construction in period from 1946 to 1953 by the Louisiana Department of Public Works.

(continued)
Table 3 - Structure Data Channels
East Franklin Watershed, Louisiana

Channel	Station	Drainage Area	Capacity Req'd	Capacity Des.	Water Surf-Elev.	Hydr. Grad.	Channel Dimensions Bottom Width	Channel Dimensions Bottom Grade	Flow Depth	Side Slope	"n" Value Aged	"n" Value As Built	Velocities Aged	Velocities As Built	Excavation	Inventory of Chan. Work [1] Type of Work	Type Chan. Before Proj.	Flow Cond. Before Proj.
		sq mi	cfs	cfs		ft/ft	ft	%	ft				fps	fps	cu yd			
L-3B2	102+35	0.55	31	33	85.5	0.00065	6.0	0.20	2.9	1.0:1	0.045	0.022	1.26	2.58		II	M2/	E
	64+00	0.73	39	39	82.6	0.00065	6.0	0.06	3.2	1.0:1	0.045	0.022	1.32	2.71		II	M2/	E
	60+00	1.59	74	92	82.3	0.00065	10.0	0.08	3.8	1.0:1	0.040	0.022	1.76	3.20		II	M2/	E
	0+00	3.66	148	164	81.7	0.00010	16.0	0.01	6.5	1.0:1	0.035	0.022	1.12	1.78	19855	II	M2/	E
L-3B3	143+00																	
	0+00	0.76		ESTIMATED											12600	II	M3/	E
M-4	202+00	0.12	8	9	79.0	0.00010	6.0	0.07	2.4	1.0:1	0.045	0.022	0.44	0.90		II	M2	E
	147+00	0.46	27	27	78.4	0.00010	6.0	0.04	4.3	1.0:1	0.045	0.022	0.60	1.23	5000	II	M2/	E
	140+00	1.53	71	138	78.3	0.00010	A= 88.75		P= 45.00		0.075	0.075	1.56	1.56		VI	M2/	E
	90+00	2.01	90	138	65.6	0.00250	A= 88.75		P= 45.00		0.075	0.075	1.56	1.56		VI	M2/	E
	25+00	3.50	140	-	63.0	0.00040	Channel Adequate Below Station 90+00 Due To Overbank Flow									VI	M2/	E
	0+00	3.50	140	-	62.0	0.00040										VI	N	E
M-4A	300+00	0.28	17	17	80.1	0.00010	8.0	0.05	3.0	1.0:1	0.045	0.022	0.52	1.07		II	N	E
	335+85	0.71	37	36	79.5	0.00010	8.0	0.05	4.2	1.0:1	0.040	0.022	0.70	1.27	3800	II	N	E
	408+35	2.51	107	265	67.7	0.00160	A= 149.80		P= 45.00		0.075	0.075	1.77	1.77		VI	N	E
M-6	30+00																	
	0+00	1.06		ESTIMATED											2600	II	M2/	E
M-7	110+00																	
	39+60			ESTIMATED												II	M2/	E
	0+00	1.85													9700	II	N	E
L-7A	25+00																	
	0+00	0.36		ESTIMATED											2200	II	O	E
M-8	130+00																	
	62+00																M2/	E
	0+00			ESTIMATED											11400	II	N	E
M-9	487+10	1.04	52	55	89.2	0.00015	A= 103.10		P= 42.00		0.050	0.022	0.66	1.50		IV	M2/	E
	435+40	1.59	73	68	88.5	0.00015	A= 103.10		P= 42.00		0.500	0.022	0.66	1.50		IV	M2/	E
	334+50	2.77	117	119	87.0	0.00015	14.0	0.03	5.6	1.0:1	0.040	0.022	1.08	1.96		II	M2/	E
	158+25	7.96	282	260	84.4	0.00015	A= 191.00		P= 45.00		0.035	0.035	1.36	1.36		VI	M2/	E
	95+00	8.71	306	304	83.5	0.00015	20.0	0.02	6.9	1.5:1	0.035	0.022	1.45	2.31	37512	II	M2/	E
	0+00	9.67	332	321	81.8	0.00015	A= 427.70		P= 87.00		0.070	0.070	0.74	0.74		VI	N	E
L-9A	234+00																	
	67+70															II	N	E
	0+00	3.07		ESTIMATED											20600	II	M2/	E
M-10	101+00																	
	59+00															II	O	E
	0+00	0.58		ESTIMATED											5700	II	N	E
M-11	50+00																	
	30+00															II	M2/	E
	0+00	2.53		ESTIMATED											4400	II	N	E
M-12	233+70	1.42	67	69	86.1	0.00075	12.0	0.09	3.0	1.0:1	0.045	0.022	1.53	3.14		II	N	E
	150+00	2.25	99	106	79.4	0.00075	12.0	0.09	3.6	1.0:1	0.040	0.022	1.89	3.44		II	N	E
	72+00	4.15	166	599	76.3	0.00040	A= 554.41		P= 112.00		0.080	0.080	1.08	1.08	17400	VI	N	E
	0+00	7.05	254	599	73.4	0.00040	A= 554.54		P= 112.00		0.080	0.080	1.08	1.08		V	N	S
L-12A	105+00															II	M2/	E
	70+00														9200	II	N	E
	0+00	2.76		ESTIMATED														
M-13	45+00																	
	0+00	0.62		ESTIMATED											3900	II	M (1951)	E
M-14	210+60	0.40	23	27	67.8	0.00080	6.0	0.10	2.5	1.0:1	0.045	0.022	1.29	2.64		II	O	E
	100+00	2.14	83	78	59.0	0.00080	6.0	0.08	4.4	1.0:1	0.045	0.022	1.71	3.50		II	O	E
	73+00	2.14	94	94	58.7	0.00010	14.0	0.05	5.5	1.0:1	0.040	0.022	0.88	1.60		II	O	E
	53+00	4.47	177	179	58.5	0.00010	14.0	0.04	6.7	1.5:1	0.035	0.022	1.11	1.77		II	M	E
	32+00	6.08	190	205	58.3	0.00010	14.0	0.04	7.2	1.5:1	0.035	0.022	1.15	1.83		II	O	E
	23+00	6.64	214	217	58.2	0.00010	14.0	0.04	7.4	1.5:1	0.035	0.022	1.17	1.86	74900	II	M	E

1/ See Attached "Coding System for Inventory of Channel Work"
2/ Available records show major construction in period from 1946 to 1953 by the Louisiana Department of Public Works.

(continued)
Table 3 - Structure Data Channels
East Franklin Watershed, Louisiana

Channel	Station	Drain-age Area	Capacity Req'd	Capacity Des.	Water Surf-Elev.	Hydr. Grad.	Channel Dimensions Bottom Width	Channel Dimensions Bottom Grade	Channel Dimensions Flow Depth	Channel Dimensions Side Slope	"n" Value Aged	"n" Value As Built	Velocities Aged	Velocities As Built	Excava-tion	Inventory of Chan. Work [1/] Type of Work	Type Chan. Before Proj.	Flow Cond. Before Proj.
		sq mi	cfs	cfs		ft/ft	ft	%	ft				fps	fps	cu yd			
L-14A	100+00																	
	0+00	1.41		ESTIMATED											8800	II	M[2/]	E
L-14B	50+00																	
	0+00	0.72		ESTIMATED											4400	II	O	E
M-16	196+00																	
	0+00	4.19		ESTIMATED											16900	II	N	E
M-17	269+44	1.79	81	81	60.2	0.00040	12.0	0.09	3.7	1.0:1	0.040	0.022	1.40	2.55		II	M(1969)	E
	151+80	5.91	221	224	54.9	0.00040	12.0	0.07	6.5	1.0:1	0.040	0.022	1.86	3.39		II	M(1969)	E
	137+00	5.91	221	229	54.3	0.00030	12.0	0.04	6.5	1.5:1	0.040	0.022	1.62	2.95		II	M(1969)	E
	92+00	10.21	350	346	52.9	0.00030	14.0	0.04	7.1	1.5:1	0.035	0.022	1.98	3.15		II	M(1969)	E
	50+00	11.73	389	382	51.5	0.00030	16.0	0.04	7.1	1.5:1	0.040	0.022	2.02	3.68	91400	II	M(1969)	E
	0+00	12.33	404	931	5.0	0.00030	A= 612.75		P= 92.00		0.060	0.060	1.52	1.52		VI	N	E
M-18	115+00																	
	0+00	3.36		ESTIMATED											10100	II	M(1957)	E
L-18A	40+00																	
	0+00	0.63		ESTIMATED											3500	II	M(1969)	E
M-20	138+50	5.38	203	204	55.4	0.00010	24.0	0.02	5.7	1.5:1	0.035	0.022	1.10	1.75		II	N	S
	73+00	6.17	228	231	54.7	0.00010	24.0	0.02	6.1	1.5:1	0.035	0.022	1.14	1.81		II	N	S
	18+40	7.15	260	266	54.2	0.00010	24.0	0.02	6.6	1.5:1	0.035	0.022	1.19	1.89		II	N	E
	0-61+60	7.72	277	-	-	-	ESTIMATED								47000	VI	N	E
M-21	240+00	9.43	328	400	55.7	0.00030	A= 260.00		P= 70.00		0.040	0.040	1.54	1.54		IV	M(1970)	E
	121+00	12.98	430	364	52.1	0.00030	A= 260.00		P= 70.00		0.040	0.040	1.44	1.44		IV	M(1970)	E
	100+00	13.20	437	542	51.5	0.00030	A= 414.00		P= 102.00		0.050	0.050	1.31	1.31		VI	N	E
	0+00	18.13	565	639	51.0	0.00005	A= 809.00		P= 129.00		0.045	0.045	0.79	0.79		VI	N	E
L-21A	143+00																	
	0+00	2.13		ESTIMATED											9000	II	M(1970)	E
M-22	101+00																	
	20+00															II	M(1972)	E
	0+00	0.99		ESTIMATED											6600	II	N	E

1/ See Attached "Coding System for Inventory of Channel Work"
2/ Available records show major construction in period from 1946 to 1953 by the Louisiana Department of Public Works.

TABLE 3A - STRUCTURAL DATA
STRUCTURES FOR WATER CONTROL (WEIRS)
EAST FRANKLIN WATERSHED, LOUISIANA

Channel	Station[1/]	Elevation of Hydraulic Gradient (m.s.l.)	Height (ft.)[2/]	Crest Elevation (m.s.l.)	Depth[3/]	Crest Width (ft.)[4/]	Side Slope	Length (ft.)
M-1	335+00	51.6	2.7	46.3	5.3	68	2/1	105
	578+00	55.8	2.7	50.5	5.3	41	2/1	78
	700+78	58.7	2.2	54.2	4.5	27	2/1	61
	775+00	60.7	2.2	56.2	4.5	27	2/1	61
M-2	330+00	58.5	2.1	54.3	4.2	27	2/1	60
	415+00	60.6	2.0	56.7	3.9	27	2/1	59
L-2A	100+00	57.1	2.1	53.0	4.1	12	2/1	44
L-2C	110+00	67.8	2.2	63.5	4.3	27	2/1	60
M-3	262+00	71.1	2.7	65.7	5.4	82	2/1	120
	335+00	71.8	2.5	66.7	5.1	81	2/1	117
	510+00	73.6	2.4	68.8	4.8	82	2/1	117
	720+00	79.4	2.2	75.1	4.3	51	2/1	84
	820+00	80.9	2.1	76.6	4.3	50	2/1	83
L-3B	12+00	72.8	2.3	68.3	4.5	52	2/1	86
L-3B-2	2+00	73.6	1.8	69.9	3.7	45	2/1	76
L-3E	6+00	75.1	2.4	70.4	4.7	22	2/1	57
	95+00	76.1	2.1	71.8	4.3	22	2/1	55
L-3F	5+00	74.2	2.1	70.1	4.1	34	2/1	66
	85+00	75.4	2.0	71.4	4.0	28	2/1	60
	135+00	76.4	1.9	72.6	3.8	28	2/1	59
M-9	106+00	83.6	2.3	78.9	4.7	36	2/1	71
	200+00	85.0	2.2	80.5	4.5	36	2/1	70
	255+00	85.9	2.0	81.8	4.1	22	2/1	54
	320+00	86.9	1.9	83.0	3.9	22	2/1	54
	370+00	87.7	1.8	84.2	3.5	22	2/1	52
M-14	33+00	58.3	2.6	53.1	5.2	28	2/1	65
M-17	70+00	52.1	2.4	47.4	4.7	31	2/1	66
M-20	138+00	55.4	2.3	52.0[5/]	3.4	41	2/1	72

1/ Locations of weirs are approximate. Final locations will be determined during construction stage.
2/ Weir depth is limited to 1/3 the design depth of the channel.
3/ Difference between elevation of Hydraulic Gradient and Crest elevation.
4/ Crest width = $\frac{\text{Cross-sectional area of channel} - (2 \times \text{Weir depth})^2}{\text{Weir depth}}$
5/ Crest elevation to be at 52.0 elevation or as specified by biologist.

Coding System for

Inventory of Channel Work

Type of Work	I -	establishment of new channel including necessary stabilization measures
	II -	enlargement or realignment of existing channel or stream
	III -	cleaning out natural or manmade channel (includes bar removal and major clearing and snagging operation)
	IV -	clearing and removal of loose debris within channel section
	V -	stabilization, by continuous treatment or localized problem areas, as primary purpose (present capacity adequate)
	VI -	present capacity adequate, no work proposed
Type of Channel Before Project	M -	manmade ditch or previously modified channel
	N -	an unmodified, well-defined natural channel or stream
	O -	no or practically no defined channel
Flow Condition Before Project	Pr -	perennial: flow at all times except during extreme drought
	I -	intermittent: continuous flow during some seasons of the year but little or no flow during other seasons
	E -	ephemeral: flow only during periods of surface runoff, otherwise dry
	S -	ponded water: no noticeable flow, caused by lack of outlet or high ground-water table

TABLE 4 - ANNUAL COST

East Franklin Watershed, Louisiana

(Dollars)1/

Evaluation Unit	Amortization of Installation Cost2/	Operation and Maintenance Cost	Total
I	72,200	41,700	113,900
II	91,200	38,300	129,500
III	25,600	16,700	42,300
IV	29,200	19,000	48,200
Project Administration	25,200	xxxx	25,200
GRAND TOTAL	243,400	115,700	359,100

1/ Price Base - 1974
2/ Fifty years @ 5 5/8 percent

May 1974

TABLE 5 - ESTIMATED AVERAGE ANNUAL FLOOD DAMAGE REDUCTION BENEFITS

East Franklin Watershed, Louisiana

(Dollars)1/

Item	Estimated Average Annual Damage		Damage Reduction Benefits
	Without Project	With Project	
Floodwater			
Agricultural			
Crop and Pasture	565,400	103,200	462,200
Nonagricultural			
Road	51,600	11,100	40,500
Subtotal	617,000	114,300	502,700
Indirect	66,800	12,500	54,300
TOTAL	683,800	126,800	557,000

1/ Price base - 1974

May 1974

TABLE 6 - COMPARISON OF BENEFITS AND COSTS FOR STRUCTURAL MEASURES

East Franklin Watershed, Louisiana

(Dollars)

Evaluation Unit	Average Annual Benefits 1/ Damage Reduction	More Intensive Land Use	Drainage	Redevelopment	Secondary	Total	Average Annual Cost	Benefit Cost Ratio
I	198,300	32,800	134,500	13,700	55,000	434,300	113,900	3.8:1
II	140,400	23,800	97,700	15,700	46,700	324,300	129,500	2.5:1
III	108,200	18,300	75,100	4,700	29,300	235,600	42,300	5.6:1
IV	110,100	19,500	80,100	5,800	27,300	242,800	48,200	5.0:1
Project Administration	xxx	xxx	xxx	xxx	xxx	xxx	25,200	xxx
GRAND TOTAL	557,000	94,400	387,400	39,900	158,300	1,237,000	359,100	3.4:1

1/ Price base 1974 current normalized prices.

May 1974

INVESTIGATIONS AND ANALYSES

Land Treatment

The U.S. Department of Agriculture, under the leadership of the Soil Conservation Service, has published conservation needs inventories for Franklin, Richland, and Catahoula Parishes. These inventories provided information on capability units by land use. Agricultural workers in the parishes supplied information on soils, capability units, and land use. This information, together with technical guidance, was used to develop land treatment needs for the watershed.

Conservation measures applied to date were determined from farm operators and from a study of field office records. This information was used in preparing Table 1A.

Conservation measures to be applied during the installation period were determined after careful consideration of the following factors:

1. Basic needs of the watershed
2. Personnel available for planning in the field office
3. Experience gained from the installation of other projects
4. Interviews with farm operators regarding their resources, desires, and willingness to install needed land treatment measures.

Hydraulic and Hydrologic Investigations

Basic data were assembled from the following sources:

1. U.S. Coast and Geodetic Survey quadrangle maps
2. Aerial photographs
3. U.S. Environmental Data Service rainfall frequency analyses
4. Field surveys of channels
5. U.S. Geological Survey and U.S. Army Engineers streamflow records
6. Field observations

7. General soil maps

8. Land use inventory

9. Fish and wildlife assessments

Hydraulic engineers computed the capacity of existing watershed channels to carry storm runoff. Stage-discharge relationships were determined at regular intervals along each channel. These determinations were made by the slope-area methods, using a design hydraulic gradient on each channel. Design gradients were set at elevations above which prolonged flooding causes damages. The elevations of design gradients at the outlets were determined by analyzing stream gage records on the Ouachita River, Tensas River, and Bayou Macon. Channel reaches were deemed adequate where the measured capacities below the design gradients equalled the design flows.

Design flows were computed with the formula, $Q = CM^{5/6}$, where Q is the required capacity in cubic feet per second, C is a coefficient related to the level of protection desired, and M is the drainage area in square miles. Research and long-term observations by drainage engineers have verified the relationship between drainage area and required discharge. Recent research has identified the relationship between C and storm runoff volume.[1/] This relationship was applied to the runoff volume of a 4-year storm to determine the required C value; C = 50 for cropland, C = 23 for forest land where cropland is located farther downstream, and C = 10 for forest land on the outlet end of channels. Project channels will reduce the frequency of damage to crops above the design gradient to an average of not more than once in 4 years. The peak flow from a 4-year storm will be out of banks, but the flow will not remain out of banks more than about 24 hours. Flooding of this duration will not cause significant crop damages.

The reduction in average annual damaging overbank flow was estimated using a curve of proportional runoff volumes (ordinates) against probability. Proportional runoff volumes corresponding to "Present" and "With Project" probabilities of damaging overbank floodings were set as lower limits of areas under the curve. The areas represent average annual damaging overbank flow volumes and were assumed to be proportional to damages induced by water.

Land surfaces lower than the design gradients will flood more frequently and stay flooded longer than in the protected areas. Forest

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1/ John C. Stephens and W. C. Mills, Using the Cypress Creek Formula to Estimate Runoff Rates in the Southern Coastal Plain and Adjacent Flatwoods Land Resource Areas, ARS 41 - 95, Agricultural Research Service, February 1965.

land runoff volumes used in design of project channels were one-fifth to one-half the volumes used for equal areas of open land. This design feature affords less encouragement for clearing forest lands for crops than using full runoff volumes. The land use in the protected areas is predominantly cropland and pastureland; the land use in the unprotected area is predominatly forest land. The flood risk in the unprotected area will discourage clearing of forest land.

The effect of channel work on downstream stages was computed at selected points. Existing peak discharges were determined by an empirical method.[2/] Increases in peak discharges were determined by a method using a graph developed by the U.S. Army Engineers.[3/] The graph relates increase in peak flow to (1) the existing channel capacity relative to the peak flow, and (2) the relative increase in channel capacity. "Present" and "With Project" discharges at each point were applied to the stage-discharge relationship to obtain stage changes. The effects of all proposed or installed public Law 566 watershed project measures in the drainage areas of streams affected by the East Franklin Watershed were included in the computation of stage changes.

Engineering Investigations

The following study was made to determine the structural measures which would be installed:

1. Using United States Geological Survey quadrangle maps as a base, a planning map was prepared showing the watershed boundary, proposed channels, drainage patterns, systems of roads, and other pertinent data.

2. Floodwater retarding structures were considered but found inapplicable, since the topography does not lend itself to those measures.

3. The Sponsors agreed upon the locations of channels they wished investigated.

4. Designs were made on these channels which would provide 1.5-year, 4-year, and 7-year levels of protection. Design and cost estimates were developed for each of the three levels of protection.

2/ V. B. Sauer, Floods in Louisiana, (2nd ed.; U.S. Geological Survey, 1964), pp. 11-21.

3/ "Alluvial Valley Area Peak Flow Increase Due to Channel Improvement," Document No. 04-08-12 (W.E.R., U.S. Army Engineers, May, 1967).

5. With assistance from the Sponsors, the watershed was divided into four areas of priority. The first priority is that area drained by channels numbered M-1 and M-2 plus all laterals draining into these main channels. Sufficient surveys and designs to extend an invitation for bids and to prepare land rights maps were made of this area. The following abbreviated survey procedure was used on the remaining areas. Field surveys were made on a representative sample of the remaining channels. Designs and cost estimates for the planned measures of these surveyed channels were developed. Costs of the unsurveyed channels were estimated based upon the surveyed channels and other watersheds with similar characteristics.

All channels have been designed to meet the criteria for stability in Soil Conservation Service Technical Release 25.

The roughness coefficients (n) for "aged" channels range from .025 to .045 depending on the value of the hydraulic radius. The relationship between the values is shown in the chart below:

HYDRAULIC RADIUS	n
Less than 2.5	0.040 - 0.045
2.5 to 4	.035 - .040
4 to 5	.030 - .035
More than 5	.025 - .030

The roughness coefficients for "as built" channels range from 0.020 to 0.025

The two grade stabilization structures are planned to prevent future channel erosion. These structures are to be placed in the channel to control a drop in water surface elevation or channel bottom elevation. The island method of construction will be used so that excessive flows will be diverted around the structures and will not overtop the embankments. These structures are designed to convey 150 percent of the drainage flow and are considered to be integral parts of the channels. These structures will assure that the channels will function properly and will reduce the amount of sediment which enters Deer Creek and Boeuf River.

Only a small number of main channels have been dug in recent years. In areas where project channels will outlet through these old channels, the outlets were investigated to determine their stability. Channels are designed so that excavation will be terminated prior to entering highly erodible outlet sections. Outlet sections that are covered with natural vegetation and show no evidence of active erosion are considered safe and stable where no additional drainage area is added.

Unit costs of structural measures were based on the going rate of similar work in the general area, with adjustment for special conditions. Land rights maps for all channels in the area of highest priority were prepared. Right-of-way costs were estimated based on the acreage required for channel enlargement, adequate berm widths and deposition of stacked spoil. Some locations and realignments of channels in the remaining priority areas will need to be made during the operations stage of the project. The Sponsors furnished ownership information. The locations of the proposed channels were checked against the ownership map to eliminate channels benefiting only one ownership or resulting, primarily, in bringing new land into agricultural production.

After the land treatment measures and those structural measures needed for flood prevention and drainage had been determined, a table was developed which gave the cost of each measure. The summation of the total costs for all needed measures represents the estimated installation costs of the project (Table 1). A second table was developed to show the annual costs of installation and operation and maintenance of the structural measures (Table 4). Pertinent physical data for individual structural measures are summarized in table 3.

Geologic Investigations

Channel Stability - Studies to insure stability of all work were conducted in accordance with Soil Conservation Service procedure. Six locations were selected for soil sampling, three on each of two representative channels. Each location was hand augured and logged, and soil samples were collected. These samples were analyzed for grain-size distribution, plasticity indices, and dispersion characteristics. In samples from five of the locations, the materials were clays with plasticity indices greater than 10; in the one other location, the material was clay with plasticity index greater than 10 at a depth of 1 foot below proposed channel bottom. Below this depth the material was silty, clayey sand with a plasticity index less than 10; however, this condition will not influence channel design because the material is below proposed channel bottom.

Materials encountered during the stability investigation were taken into consideration when estimating costs of water control structures.

Sedimentation - Sheet erosion was calculated by use of the Musgrave Equation. This equation states that

$$C = FR \left(\frac{S}{10}\right)^{1.35} \left(\frac{L}{72.6}\right)^{.35} \left(\frac{P_{30}}{1.375}\right)^{1.75}$$

where

E = Sheet erosion, tons per acre per year

F = Soil factor, basic erosion rate in tons per acre per year for each soil series or unit

R = Cover factor

S = Slope

L = Length of land slope in feet

P_{30} = Maximum 30-minute, 2-year frequency rainfall in inches.

For a discussion on the background of this formula, see page 38 of "Applied Sedimentation," edited by P. D. Trask.[4/]

For purposes of computing sedimentation, each evaluation unit was analyzed separately. This allowed a more definitive approach as to delivery ratios and downstream effects.

Present cover factors were based on observation and records as to amounts and types of land treatment measures that had been applied. Future without project cover factors were estimated, based on the rate of increase of application of land treatment measures. Project cover factors were based on the accelerated rate of application of land treatment measures necessary to achieve the objectives of the plan. This will be accomplished by accelerated technical assistance.

The sediment yields to specific points were calculated on a sediment delivery ratio. This ratio is based primarily on drainage areas. Its accuracy has been established through sedimentation surveys. Trap efficiency of water control structures has been estimated based on location, grain size, and on previous sedimentation surveys conducted by the Agricultural Research Service and the Soil Conservation Service.

Suspended sediment estimates were based on the average annual sediment rate and the average annual runoff. The amount of channel bank erosion which will occur due to construction has been estimated based on the type of material being disturbed, the size of the channel, the methods of construction, and the vegetative practices which are being instituted as part of the construction plan. A sequence of construction has been selected so that the reduction in sediment due to land treatment and structural measures will exceed the amount of erosion induced by construction.

4/ P. D. Trask, Applied Sedimentation (New York: John Wiley & Sons, Inc., 1950), p. 38.

Groundwater and Mineral - These consisted of a review of pertinent literature.

Fish and Wildlife Investigations

Several field trips were made in this watershed by biologists of the U.S. Fish and Wildlife Service, the Louisiana Wild Life and Fisheries Commission, and the Soil Conservation Service. The proposed works were reviewed in the field with the aid of aerial photos and topographic maps and other pertinent data provided by the Soil Conservation Service. Proposed works in the promimity of high value aquatic and terrestrial habitat were evaluated.

Following the field trips, both the U.S. Fish and Wildlife Service and the Louisiana Wild Life and Fisheries Commission submitted reports listing suggestions and alternatives to lessen damages to the fish and wildlife resources. These suggestions and alternatives have been incorporated in this plan.

Preproject habitat conditions and populations of game and fish species were determined from a review of available literature, data provided by the Louisiana Wild Life and Fisheries Commission and field investigations. Postproject populations were estimated after a determination was made of the habitat lost or gained as a result of the project.

Water quality data was collected and analyzed with a Hach DR/2 Spectrophotometer and Hach pH and oxygen kits. Samples were collected at (1) lower reaches of Deer Creek, (2) Bayou Macon "cutoff No. 1," (3) Bayou Macon "cutoff No. 2," and (4) Bayou Macon "cutoff No. 3." Fish populations were measured, taking one acre rotenone samples in Bayou Macon "cutoff No. 2" and "cutoff No. 3."

An inventory of wetland types and ponds was conducted. Wetland types were classified according to guidelines in USDI Circular No. 39. Project effects on lakes, ponds, and wetland types were determined.

A monitoring program has been started on this project to check pre- and post-construction levels of pesticides, nutrients, and other water quality parameters. This program will be conducted for a minimum of 2 years pre-construction and 5 years post-construction.

Economic Investigations

The U.S. Army Corps of Engineers in making their studies of the Boeuf and Tensas Rivers and Bayou Macon had divided the project areas into three zones of influence. These were:

1. A zone - areas not flooding from the flood of record on the Boeuf and Tensas Rivers and Bayou Macon.

2. B zone - areas flooding between the level of the flood of record and the 5-year frequency storm on the Boeuf and Tensas Rivers and Bayou Macon.

3. C zone - areas flooding from storms smaller than the 5-year frequency storm on the Boeuf and Tensas Rivers and Bayou Macon.

Some of these areas would also benefit from Public Law 566 projects. However, both the Corps and the Soil Conservation Service could not claim benefits on areas common to projects of each agency without "double counting" benefits. Therefore, a procedure was developed to share benefits.

In the "A" zone, there would be little effect from Corps projects since these areas are above the flood of record. Flooding and drainage problems existing in these zones occur from localized conditions. Therefore, all the benefits in these areas could be allocated to Public Law 566 works.

The "B" zone is an area of influence common to projects of both agencies. The Corps projects improve the major outlets which are essential to improving internal drainage systems. Therefore, the Corps and Public Law 566 projects in this zone are complementary. In the "B" zone, the separation of benefits by standard procedures is not possible. Consequently, benefits are allocated to each agency's project according to the proportionate share of combined estimated costs for all projects of both agencies in the basin. On this basis, 87.35 percent of all benefits were allocated to Corps projects, and 12.65 percent were allocated to Public Law 566 projects.

The "C" zone is influenced by projects of both agencies. However, the frequency of backwater flooding in these areas is so high that 100 percent of the benefits were allocated to Corps projects.

For project evaluation, the watershed was divided into four hydrologic areas or evaluation units (I, II, III, IV). Each of these units was further divided according to the three zones. Since benefits in the "C" zone would be allocated 100 percent to the Corps, these zones were not included in the evaluation. Only the "A" and "B" zones in each unit were evaluated. This was done according to the procedure described.

INVESTIGATIONS

Basic data were obtained from local farmers, agricultural workers, state and parish officials, the state experiment stations, agricultural published and unpublished data, and parish agricultural statistics.

Yields obtained on problem and non-problem land and on poorly-drained and well-drained soils were analyzed from basic data. By associating certain soils with the "A" and "B" zones, differences in yields were established for both zones.

Representative problem-free yields for the various crops were developed by projecting Franklin Parish yields to the year 2000 and adjusting them according to percent of effects derived earlier. Representative yields for future without-project conditions were established by developing present without-project yields on problem areas and projecting them to the year 2000.

Representative with-project yields were developed by first determining a total loss of yields. This amounted to the difference between future without-project yields and future problem free-yields. The percent reduction of out-of-bank flow (78.4 percent) was then applied to the various yield losses to determine the amount recoverable with the project. The remaining loss was deducted from the problem-free yields to arrive at the yields with the project. The percent reduction of out-of-bank flow utilized in this evaluation indicates that with the project installed, the drainage system will adequately remove within 24 hours the runoff from an event that has an average recurrence interval of 4 years. Installing project channels will effect a reduction of 78.4 percent in the average annual overbank flow volume. This percentage was also used to reflect the damage reduction allocated to flood prevention and to the reduction in road damages.

Production budgets were developed from locally obtained data for the various crops and pasture for the levels of production except for rice. Data for rice production on the same type soils in the West Carroll Watershed was used.

The net returns for each of these three levels were plotted on graphs for each crop and for pasture. In subsequent steps of the evaluation, any net return was readily obtained from these curves for any given yield. These budgets were originally developed in 1969 but were updated for this evaluation. Current prices were used for costs, and current normalized prices were used for returns.

The total increase in net returns attributed to the project was developed by applying the pertinent yields to the net return curves to

obtain total net returns for future without- and future with-project conditions. The increase in net returns represented the direct primary inseparable agricultural benefits attributed to the project.

These benefits were adjusted to allow for a 10-year lag in time until the full level of benefits would be realized. The benefits were further adjusted by deducting costs associated with the project, otherwise known as associated costs. Associated costs are costs for on-farm measures which in this watershed consist of mains and laterals, drainage field ditches, structures for water control, grade stabilization structures, and drainage land grading. They are essential for the farmer to realize the benefits of the project.

Flood prevention, drainage and more intensive use benefits are based on increased net income expected with the planned project. More intensive use benefits are estimated to be 10 percent of the increased net income. The remaining increased net income benefits were allocated to flood prevention and drainage in the same proportions costs were allocated.

Costs were allocated to flood prevention and drainage according to the second method described in paragraph 103.0221 of the Watershed Protection Handbook. Eight and eight-tenths percent of the watershed consists of "nonwet" soils.[5/] Therefore, 8.8 percent of the remaining 90 percent of benefits, after allocating more intensive use, were allocated to flood prevention. The amount remaining after this deduction was then allocated to drainage and flood prevention on a 50-50 basis. The overall allocation on this basis amounted to 54.4 percent for flood prevention and 45.6 percent for drainage.

Benefits and costs were allocated in this manner because drainage is considered to be no problem on "nonwet" soils. Therefore, all damages occurring on these soils are attributed to flooding only. All "wet" soils are considered to have an inseparable problem of flooding and drainage.

Annual road damages were evaluated on the basis of increased maintenance costs on roads in areas subject to inundation by floodwater.

Indirect damages were estimated to be 10 percent of the direct flood damages to agriculture and 20 percent of the flood damage to roads. Indirect benefits were the differences between indirect damages without- and with-project. These costs incurred as a result

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5/ Wet and nonwet soils are synonymous with wet and nonwet land. Wet soils comprise land having inseparable flood and drainage problems and for purposes of evaluation are termed wet land. Nonwet land was considered as soils on slopes and having no drainage problems.

of flooding but not directly related to flooding. They include additional travel from detours, loss of wages, etc.

Redevelopment benefits were calculated on the basis of 20 percent of the construction costs being wages paid to otherwise unemployed or underemployed local labor. Similarly, benefits were calculated on 50 percent of the annual cost of chemical maintenance and declining to zero over a 20 year period.

Secondary benefits induced by and stemming from the project were considered to be 10 percent of the primary agricultural benefits, the direct flood damage reduction to roads, the increase in total production costs attributed to the project, the associated costs, and the annual operation and maintenance costs of the project.

Total installation costs were amortized over the 50 year project period, using the discount factor in effect at the time of the evaluation. Annual operation and maintenance costs were added to these annual installation costs to arrive at the total annual costs of the project. These costs were summarized in table 4.

Allocated flood prevention damages and benefits were summarized in table 5. All benefits and costs were summarized in table 6 and BC ratios were calculated for each evaluation unit and for the project as a whole.

Archaeological, Historic, and Scientific Investigations

Scanning the "National Register of Historic Places" revealed that there are no sites within the East Franklin Watershed that have been placed on the registry. Written communications from the Curator of Anthropology of Louisiana State University indicated that 26 archaeological sites had been recorded in the watershed.

These initial inquiries were followed by archaeological survey along specified channels. The search for prehistoric and historic cultural remains was conducted by archaeologists from the Geosciences Department and the Research Institute of Northeast Louisiana University.

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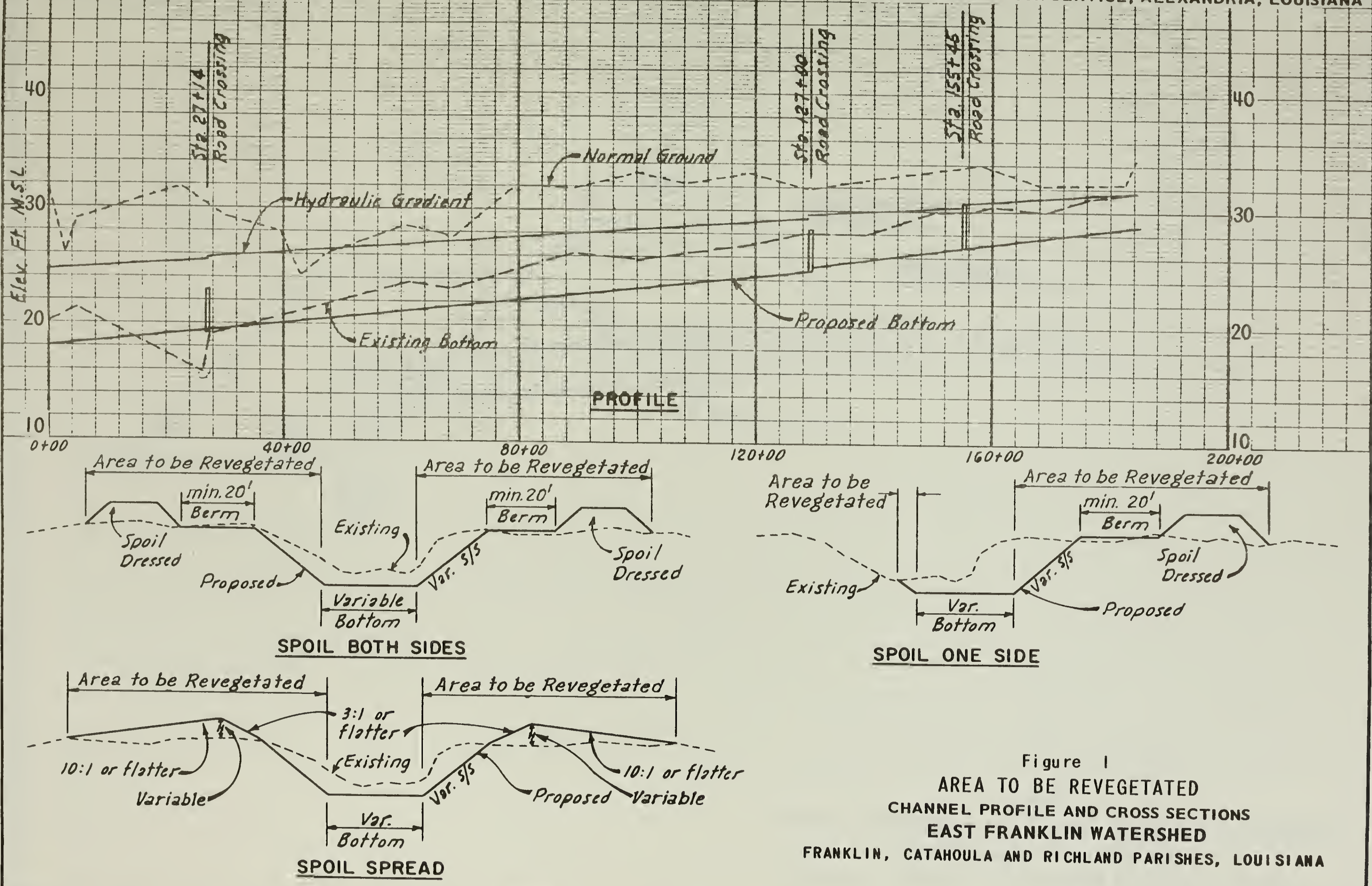

Figure 1

AREA TO BE REVEGETATED

CHANNEL PROFILE AND CROSS SECTIONS

EAST FRANKLIN WATERSHED

FRANKLIN, CATAHOULA AND RICHLAND PARISHES, LOUISIANA

REVISED DECEMBER 1974 4-R-33666

U.S. DEPARTMENT OF AGRICULTURE

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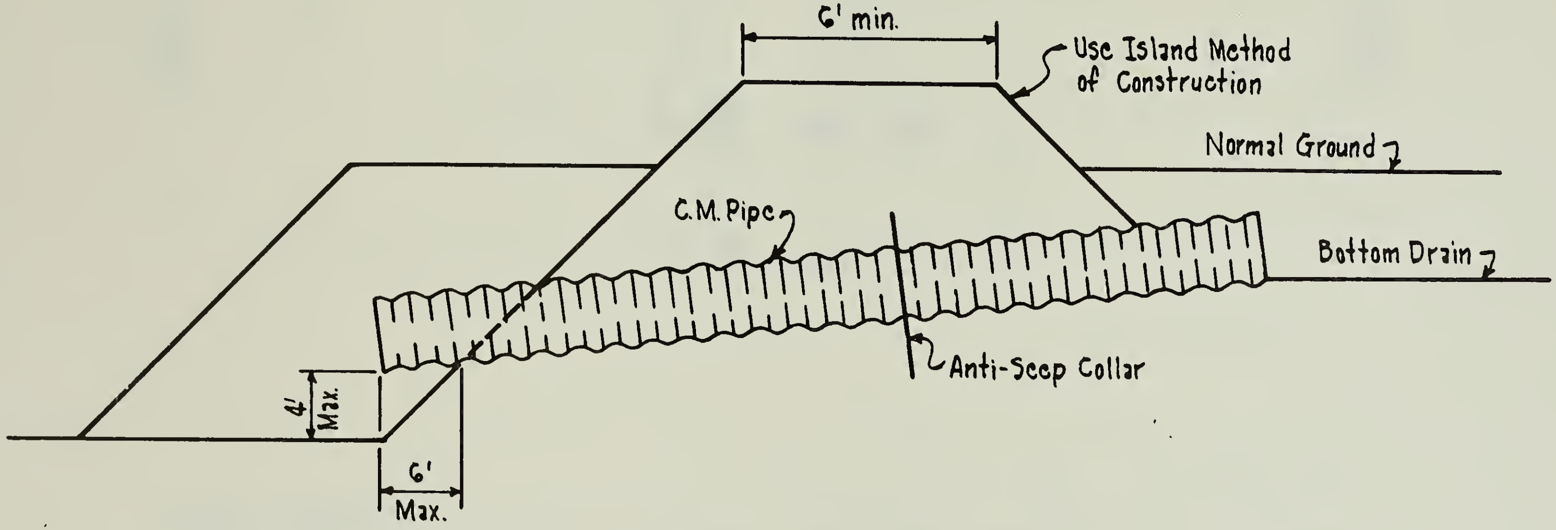

Figure 2

TYPICAL STRUCTURE FOR WATER CONTROL (PIPE DROP)

EAST FRANKLIN WATERSHED

FRANKLIN, CATAHOULA AND RICHLAND PARISHES, LOUISIANA

MARCH 1974 4-R-33767

USDA-SCS-FORT WORTH, TEX. 1974

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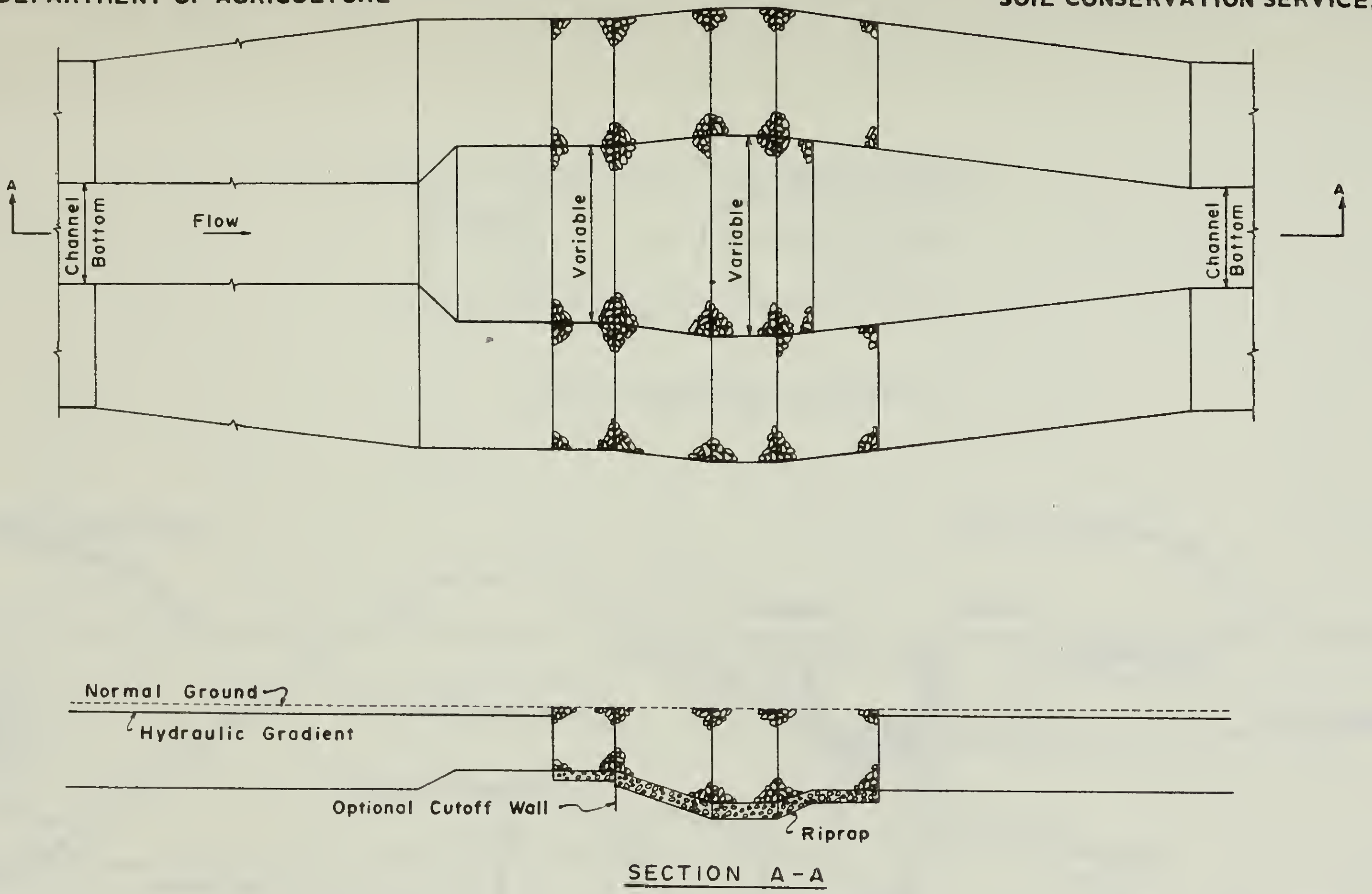

Figure 3

TYPICAL STRUCTURE FOR WATER CONTROL (WEIR)

EAST FRANKLIN WATERSHED

FRANKLIN, CATAHOULA AND RICHLAND PARISHES, LOUISIANA

MAY 1974 4-R-33768

USDA SCS FORT WORTH TEX 1974

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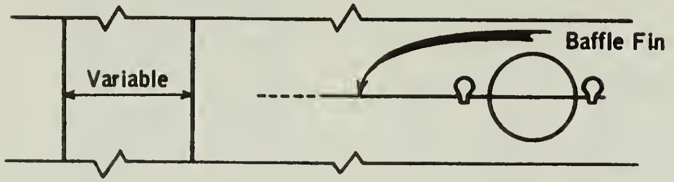
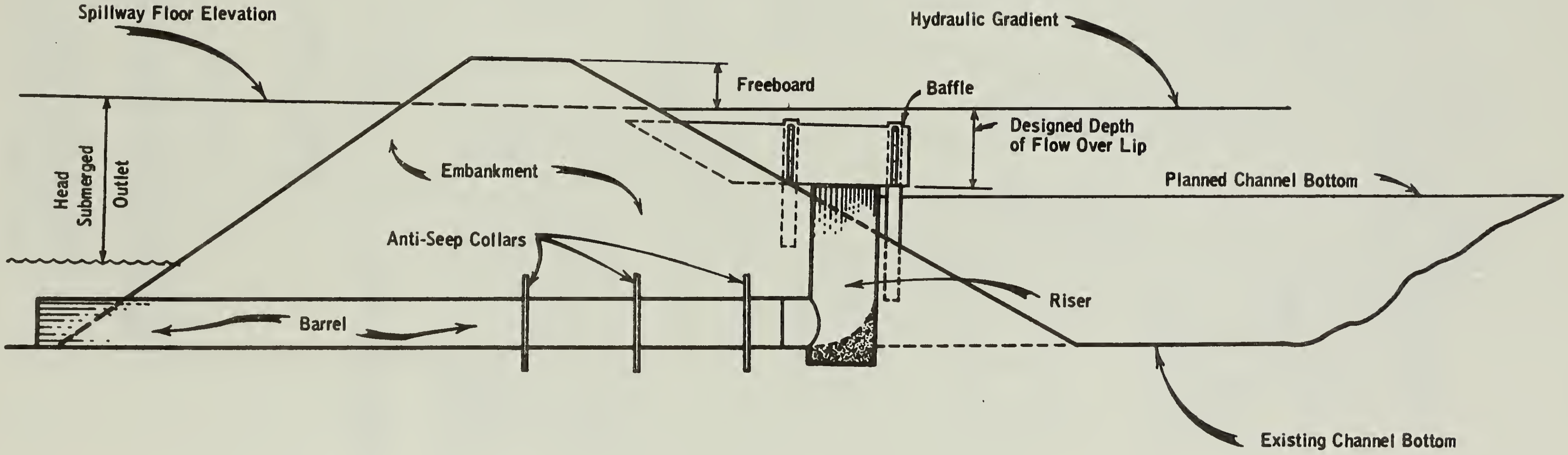


PLAN VIEW OF BAFFLE AND RISER



SECTION VIEW

Figure 4

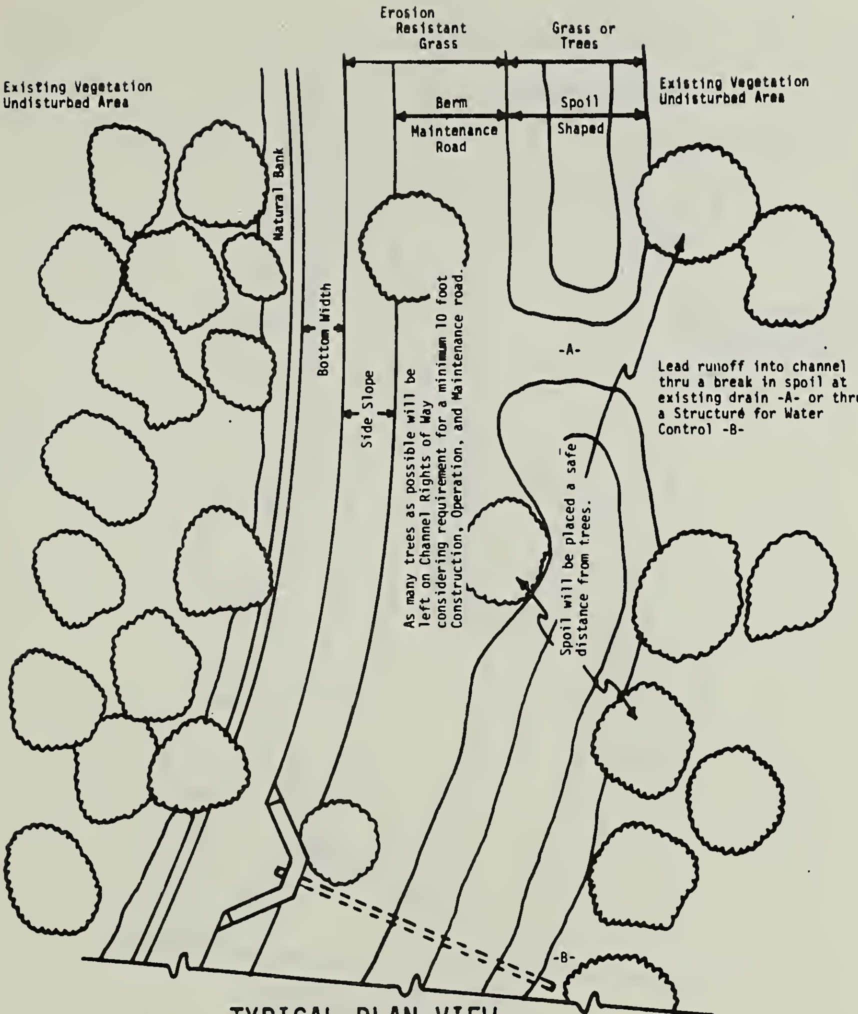
GRADE STABILIZATION STRUCTURE

EAST FRANKLIN WATERSHED

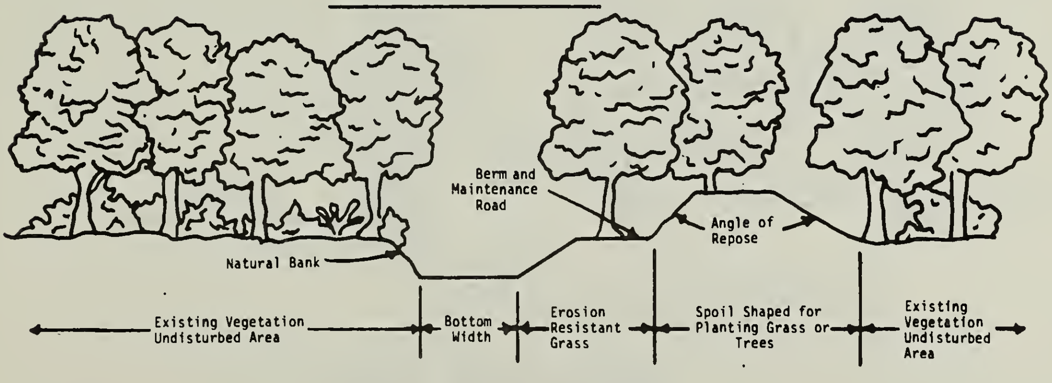
FRANKLIN, CATAHOULA AND RICHLAND PARISHES, LOUISIANA

MARCH 1974 4-R-33769

USDA-SCS-FORT WORTH, TEX. 1974



TYPICAL PLAN VIEW

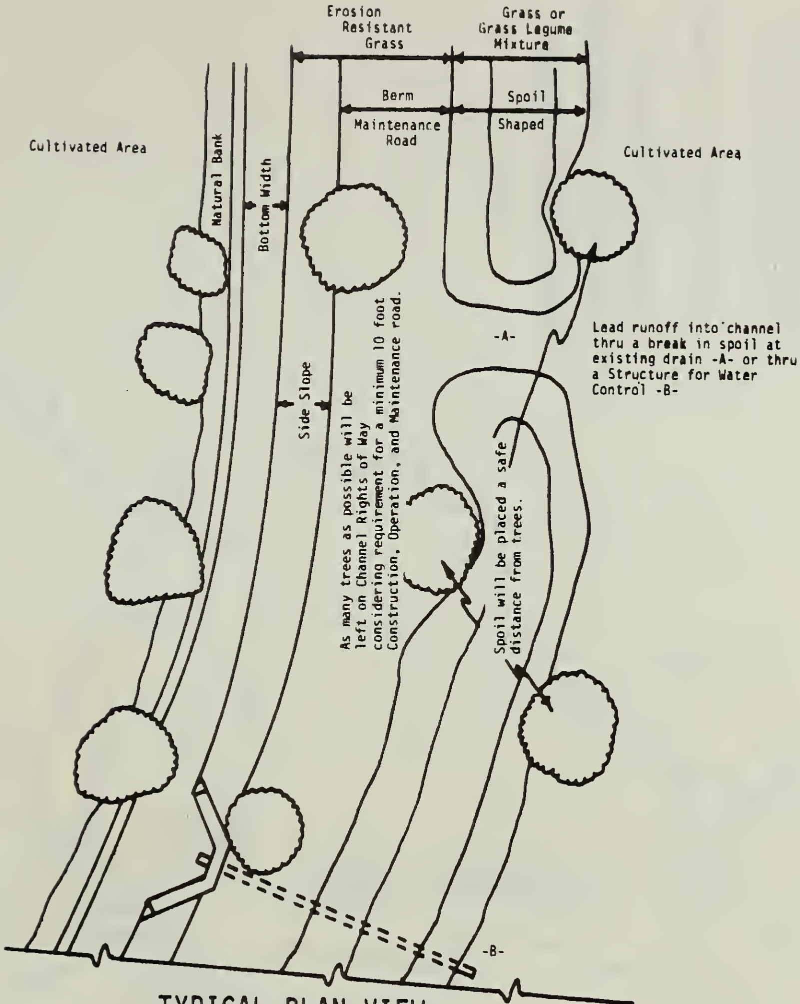


TYPICAL CROSS SECTION

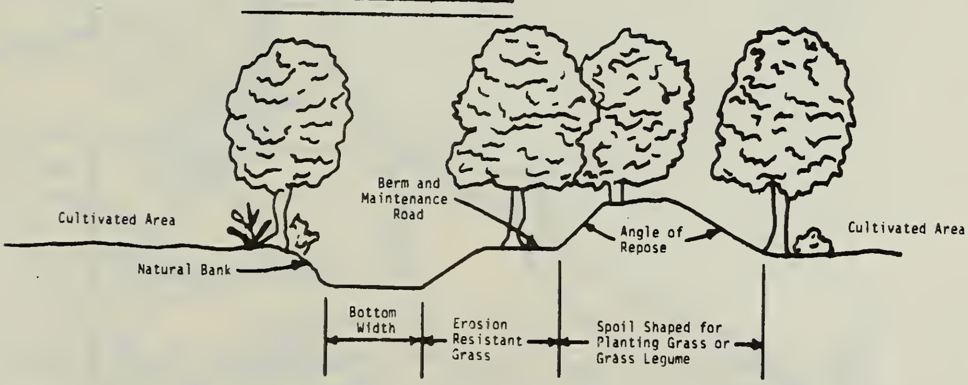
FIGURE 5

TYPICAL PLAN VIEW AND CROSS SECTION
OF CHANNELS THROUGH FOREST LAND

EAST FRANKLIN WATERSHED
Franklin, Catahoula and Richland
Parishes, Louisiana



TYPICAL PLAN VIEW

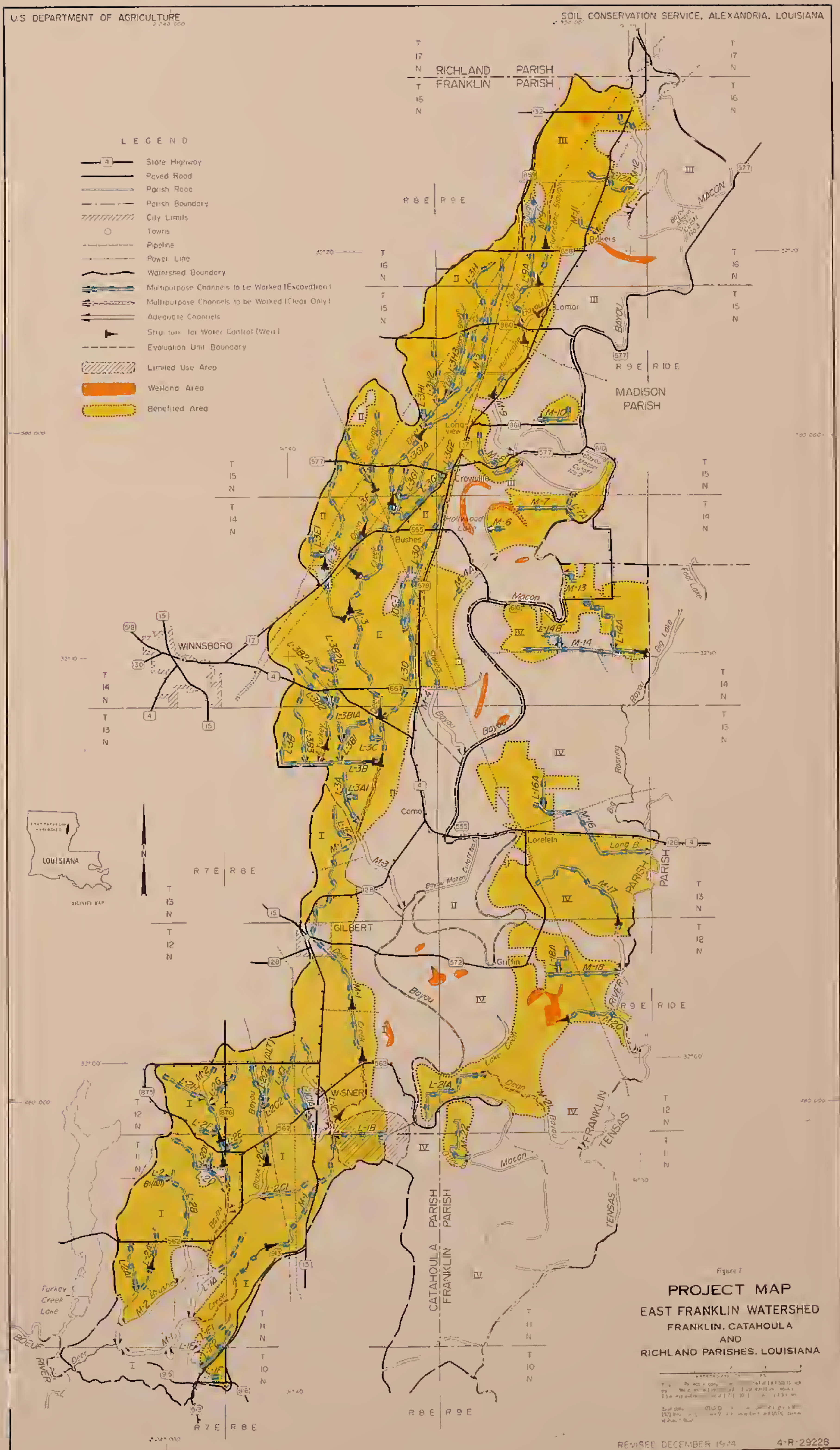


TYPICAL CROSS SECTION

FIGURE 6

TYPICAL PLAN VIEW AND CROSS SECTION
OF CHANNELS WHERE WOODY VEGETATION
EXISTS ADJACENT TO CULTIVATED AREA

EAST FRANKLIN WATERSHED
Franklin, Catahoula and Richland
Parishes, Louisiana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LEGEND
State Highway
Paved Road
Parish Road
Parish Boundary
City Limits
Towns
Pipeline
Power Line
Watershed Boundary
Multipurpose Channels to be Worked (Excavation)
Multipurpose Channels to be Worked (Clear Only)
Adequate Channels
Structure for Water Control (Weir)
Evaluation Unit Boundary
Limited Use Area
Wetland Area
Benefited Area
RICHLAND PARISH
FRANKLIN PARISH
MADISON PARISH
WINNSBORO
Crowville
Bushes
Lamar
Bakers
Como
Loreleln
GILBERT
Griffin
WISNER
LOUISIANA
CATAHOULA PARISH
FRANKLIN PARISH
FRANKLIN
TENSAS
Figure 7
PROJECT MAP
EAST FRANKLIN WATERSHED
FRANKLIN, CATAHOULA
AND
RICHLAND PARISHES, LOUISIANA
REVISED DECEMBER 1974
4-R-29228